NOTES FOR CURSOR #1 - JULY, 1978

Welcome to the first issue of CURSOR - the original cassette magazine for the Commodore PET computer.

First things first. CURSOR is _not_ affiliated in any way with Commodore Business Machines, Inc. They are the good folks who manufacture the PET computer, and as you might guess, PET is their trademark! (And **CURSOR** is ours.)

What is CURSOR all about? It is a monthly magazine that comes to you as a cassette with five programs for your PET. (If you have one of those rare 4K PETs, please return this cassette and we will return your money.) Each issue of CURSOR has a "featured game" that might cost $9.95 or more elsewhere. But CURSOR will also have serious programs such as practical utility programs, statistical analysis, and educational offerings.

Our philosophy is simple: CURSOR is a high-volume, low mark-up means of distributing high quality software for the PET. We make only a small profit on each subscription, and we think (hope?) that many people will subscribe.

CURSOR #1 HAS THESE PROGRAMS:

COVER	Our graphic "Front Cover". Press [SPACE] key to read the Table of Contents.
BRICK	Throw a brick as close to a window as possible. Addictive!
WANDER	A (drunk) worm crawls over the screen of your PET.
SHARK	You are a great white shark that eats people, while skin-divers try to kill you. Ouch!
PLOT	A simple demonstration of plotting.
TYPER	A typewriter demo (for the "little" keyboard).

As with most other magazines, we expect that you will like some parts of CURSOR better than others. Please let us know, so we can bring you the kind of programs that most people want. And submit one of your own programs for publication!

MORE ABOUT THE PROGRAMS

COVER... Not much to say, except we'd like to see your design for our next cover. See our comments below on how to submit programs.

BRICK... You throw a brick that disappears about halfway to the window. Each brick goes at a different speed, and disappears at a different spot. You lose 563 points when you break the window. If you can keep your average score over 250, you are very good.

WANDER... A delightful little time waster. You set the length (about 75 is intersting). Freeze the worm by pressing the [SPACE] key, then press [SPACE] again to make it start crawling. After freezing the little beast, you can change the character that makes his body by pressing the key of your choice. You can reset the length by pressing [CLEAR] after freezing the worm.

SHARK... As you look at the screen of the PET, you are looking down at a crowded California beach. When the program begins, you set three conditions:

How many traps?	(Try about 5)	Maximum: 25
How many swimmers?	(Oh, maybe 25)	Maximum:100
How many divers?	(1 or 2)	Maximum: 25

You move by pressing number keys. The [5] key is your current location, [8] moves the shark up, [2] moves it down, etc. The swimmers know about the sharks, and try to swim away to the safety of the beach. The skin divers try to kill the poor helpless shark!

ABOUT YOUR CURSOR CASSETTE TAPE

There are some simple precautions you can take to assure a good "load" of the programs we send to you. First, be sure the head of your PET recorder is clean, and that it has been demagnetized within the last 20 hours of use. Second, completely rewind the tape to "excercise" it. Tapes can bind slightly after being mailed. If you get a "load error", (or get strange results, such as "syntax error" when you RUN the program), try loading the program a second or third time. If the program still does not load, please mail us the cassette with a brief note telling us what was wrong, which program gave you trouble, and the serial number of your PET. We will send a replacement tape the same day we receive your cassette.

YOUR PROGRAMS IN CURSOR

Yes, we purchase programs! We want original, interesting programs. We will try to evaluate each program and get back to you within four weeks. We especially need practical programs that will be useful to people in business or at home, and good educational material. Games will also be considered, but please remember, we sell only to people with PET computers, and any games we publish must use the excellent graphics available on the PET. Please put your name, address and telephone number in REM statements in the program, as well as marking the cassette very clearly! We pay well, and of course we give credit to each author.

A CURSORY GLANCE

Here is the second issue of CURSOR(tm) – the cassette magazine of programs for your Commodore PET. We **are** a little late with CURSOR #2, mainly due to logistical problems and the normal growing pains of a new enterprise. The response to CURSOR #1 has been great! We know that there is plenty of room left for improvement, especially in terms of getting a wider range of programs published. But people are pleased with the value we provide and the good service we give. Yes, we have had a few tapes returned, (which we have promptly replaced in each case). But after quite a bit of work with our consultants, we have developed a very reliable mass duplication facility. We have also switched to a very high quality tape. (After running drop-out tests on several brands, I can assure you that there **is** a big difference).

We've said it before, and we will say it again: CURSOR(tm) is **not** affiliated in any way with Commodore Business Machines, Inc. They manufacture the fine PET computer, and PET is their trademark. We publish software for you to enjoy with your PET, and distribute it as a monthly cassette magazine. We are specialized, high-volume and low-markup. We don't think you will find a better value for your software dollar anywhere else! Incidentally, if you have written PET programs that you'd like to sell on a "first publication" basis, please drop us a note. We promise to review your programs promptly, we pay well, and we won't rip you off. We will require that you sign a statement that the work is original, since there is no way that we can review all of the programs that are sold by others, and we do not want to publish anything that belongs to some other publisher.

HACKER HINTS

If you type something that you want the PET to ignore, press [SHIFT], hold it down, and then press [RETURN]. The effect: the last line you typed is "thrown on the floor". This is useful when you are editing something and things get messed-up (such as inside quote marks...).

If you type the first letter of most PET commands, then the second letter shifted, then [RETURN], it acts as though you had typed the entire comamnd. I like to use this "shorthand" for LIST since that is a command that is so frequently used.During program development, I always like to save two (or even three) copies of a program. There are two tricks and only your own taste will determine which you prefer.

The first trick is to type multiple commands on the same line, with a colon between them, e.g. SAVE "AZ.1":SAVE"AZ.1" [RETURN]. Now, go get a beer (or a cup of herb tea) and watch the evening news while your PET faithfully records two copies of your program, one after the other.

The other way is slightly more complicated: type SAVE "AZ.1", then [RETURN]. After it records the first copy, it will say READY. Now, use the cursor control keys to move the cursor up four lines to where your original command still appears on the screen. Press [RETURN], and bingo! the PET goes off and does what you told it to do.

CURSOR 2 HAS THESE PROGRAMS	
COVER	Our "Front Cover". After you have enjoyed looking at the graphic design on the cover, press the [SPACE] key to read the Table of Contents.
RACE	A 1 or 2 person auto race game that will keep you busy for a while. You can control the number of players, the number of obstacles or "pylons" that will appear in the track, and the speed of your car.
ZAP	You control a rather strange missile, and try to hit targets that appear on the screen. Addictive.
EST	The program presents various lengths of bars and sizes of rectangles so you can estimate length and area in metric units. It's harder than you might think...
GUESS	A number guessing game where you try to trap a number the computer selects.
MAD	You supply the words to "fill in the blanks" to one of five crazy stories.

MORE ABOUT THE PROGRAMS

COVER... You can change the characters that are displayed by modifying the DATA statement at line 7, which is the list of graphic characters from which it selects to produce the next block. These blocks will be reverse video half of the time (see line 2150). You may also want to tinker with line 2200, which sets the limits on how long the programs waits before displaying the next block of characters. The variable ZZ controls the delay, which currently ranges from 20 to 170.

RACE... You will probably want to use a speed of 100 unless your reflexes are <u>really</u> slow. About 8 pylons makes for a fun game. There is a clock for each player, the one on the right is for the player who uses the numeric pad. Beside each clock is the symbol for that players auto. Note that your clock keeps on ticking when you stop your car. Authors: Glen Fisher and Ken Kasmar.

ZAP... You control a missile, and try to hit targets. Each one you hit makes your missile get bigger. After you've been able to hit a few, it gets to be difficult to just avoid crashing into your own tail. After six crashes, you start a new game, and get a report on how well you performed. Author: Tom Marazita.

EST... EST is an estimation excercise that will make you flex your metric muscles a little bit. You get to guess the length of line segments, or the area of rectangles. Since it is a game of estimation, you are allowed plus or minus 1.25 cm. for length, and plus or minus 1.0 cm. one each side of a rectangle. If you are a purist, you can calibrate the program for the characteristics of your PET's video. Measure the length of 39 horizontal shaded squares, then modify line 470. Measure the length of 23 vertical squares, then modify the correction factor in line 475. For example, on our PET, 39 horizontal squares measured 15.8 cm. Don't bother with calibration unless you really, really care whether the program lies a little, such as claiming a line segment is 12.8 cm. when it is really 12.1 cm. Author: Glen Fisher.

GUESS... This is really the game sometimes called "Trap", where you try to trap the secret number that the program selects. Hint: try to eliminate as many numbers as possible at each guess. If you guess the number in five tries, you are good! Author: Glen Fisher

MAD... You fill in the blanks for one of five stories or other weird text items. You are asked for "parts of speech". Here is a quick refresher if you have forgotten...VERB - an action word (HIT, CARESS, RUN); NOUN - name of a person, place or thing (COMPUTER, SKY, ROCK, WOMAN); ADJECTIVE - modifies (get this) verbs, adjectives, adverbs, a preposition, phrases, clauses or even a sentence (QUICKLY, HORRIBLY, VERY, UNUSUALLY, SLOWLY). I've used a similar program to demonstrate large timesharing computers to school children and found that they loved it. Author: Glen Fisher.

It's easy to add your own stories or to change ours. The variable NS is the number of stories (see line 150). The stories are stored in DATA statements at line 10065. Each story begins with the graphic character "Q" (a shifted Q). This character must also be at the end of the last story. A backslash "\" means "go to the next line on the screen". Two backslashes will give you a blank line. The dictionary of substitution words begins at line 10,000. For example, when MAD finds a %A in the text of a story, it has you provide an adverb. Here is the dictionary.

%A ADVERB	%E EXCLAMATION	%%U NUMBER
%B PART OF YOUR BODY	%J ADJECTIVE	%V VERB
%C DISASTER	%N NOUN	%Y ANIMAL
%D DISEASE	%P PLURAL NOUN	%Z A PERSON'S NAME

DEPARTMENT OF PHILOSOPHY

We want to provide you with high quality, but inexpensive software for your PET. We think that when software is priced right, people won't rip it off by making copies for other folks. I don't expect to become a millionaire from CURSOR, but I am not doing it for my health or as a hobby either. So, please let your friends know about the magazine, show it off at your club, meetings, etc., etc., but please don't make copies for other people! You are the ones that will lose in the long run if software publishers, such as CURSOR, are not able to continue to produce programs at a reasonable cost.

ABOUT YOUR CURSOR CASSETTE TAPE

Please clean the head of your PET tape recorder, and demagnetize it, if you haven't done so in the last month or so of use. Next, put our tape in, and "exercise the tape by using ·fast forward" to go clear to the other end of the tape, then "rewind" it back to the beginning. (Tapes can bind slightly after being mailed). If you do get a "load error", or get strange results when running the program, (such as "syntax error"), first, try loading the tape a second or third time. Should it still not work, please mail us the cassette with a note telling what problems you had and we will promptly replace your cassette.

A CURSORY GLANCE

Well, here is CURSOR #3, and somehow it is late (again). We are working hard to get to the point where it will be on time. Next month, maybe? But even though we are "tardy", it is a great issue. I think you will appreciate the bar graphing programs, the two games (sound effects for QUIX!), and the very good programs for creating and using flash cards.

Nope! We are not affiliated with Commodore Business machines, Inc. They make the excellent Pet personal computer, and in fact, Pet is their trademark (or so I am told). CURSOR, incidentally, is our trademark.

Rumor: Commodore is finally shipping the long-awaited tape with the demo programs and the machine language monitor. The tape goes out with each new machine, then the earliest Pet owners, and so forth. So, if you recently got your machine, you may have to wait a little while.

WARNING: Some people are selling programs that don't belong to them. If you know of people who are selling our programs, I'd appreciate knowing about them. A related problem is the fact that people try to sell programs to us that they have copied (with minor changes), from other peoples published work. If software publishing is to survive, we've got to find a solution to this mess.

Thank you for your support of CURSOR. We are growing fast, but still try to be responsive to your needs. Our most effective advertising is the "word of mouth" that you have been giving us. If you are a member of a computer club, please be sure and let other Pet owners know about us.

WHAT ARE THESE LITTLE MACHINES GOOD FOR???

Recently, Robert Pursor (PO Box 466, El Dorado, CA 95623) sent me a copy of his Reference List of Pet, TRS-80, and APPLE Computer Cassettes. The Reference List is full of info on Pet software. (Although he somehow missed CURSOR. Tsk. Tsk.)

What caught my eye was this quote: "Looking for a complete business for inventory, accounts receivable, and other business headaches? As a general rule, FORGET IT!" Basically, I think Bob is right, although it won't be too long before there are decent systems available. If you are using your Pet in "serious" applications, I'd like to hear from you. In any case, I'd like to know what you are using your Pet for, or what you would like to be using it for...

P.S. I think the eventual winner is the small-but-serious part of this market will be: IBM. Laugh if you like, but anywhere there is a large market, IBM will not be far behind. And when you buy their machine, you will know where to get it fixed. It may be less of a leap from making a giant machines to making little machines than it is from making calculators to producing Pets.

| CURSOR 3 HAS THESE PROGRAMS: (Programs that end with '!' use CB2 sound)	
BAR	A vertical bar graphing program.
DOTS	The game of Dots – you against the computer.
QUIX	A memory game with great sound effects.
FLASH	Review "flash cards" in random order.
CARDS	Produces the tapes for the FLASH program.

MORE ABOUT THE PROGRAMS

BAR... This program provides an excellent bar graphing facility. We use every bit of space, yet allow you to have long, meaningful labels for each bar. If you use the "Headings" option, you provide a label for each number that you want to graph. Then, when the graph is displayed, press the letter code for any bar, and Bingo! - the 36 character label appears. You can select either a single graphing character, or - if you give it several character, it will use them one after another. You get to select the width of the bars: there are 34 columns available, so with bars that are 2 columns wide you can get 17 on the screen, 3 columns gives you 11 bars, etc. You can leave a "blank" bar between bars by hitting [RETURN] instead of entering a number. (I like to leave a blank bar as the last thing on the graph - it looks better that way to me.) To stop entering numbers, type a minus sign on a line all by itself and hit [RETURN]. Your graph will be plotted, and a question mark will flash in the lower right corner. If you want to enter numbers for another graph, press [RETURN]. It will ask "More Graphs?". At this point, you can change your mind and look at the last graph again by typing a "left arrow" (<-). Author Glen Fisher.

DOTS... You play the game of Dots against your Pet on a six by six board. The numeric keys are used to control the movement of the cursor: [8]=up, [2]=down, [4]=left, [6]=right. The "diagonal" keys ([1],[3],[7], and [9]) are used to move from vertical to horizontal and vice versa. Once the cursor is where you want to draw a line, press [RETURN]. While the Pet is "thinking", it displays a wave-like pattern. (See line size of the board at line 130. A bigger board gives slower play... Author Glen Fisher.

QUIX!... What a game! The Pet flashes a pattern on the screen that you try to repeat. The pattern gradually gets longer, and it flashes more quickly. If you follow our directions, it will have super sound effects with each flashing pattern. WARNING: If you zorch your Pet by hooking it up to an amplifier, that is your responsibility. We think that the method shown here is safe, since we have used it, but we don't want to pay for your Pet. Please be careful!

Most hi-fi sets have an RCA style jack where you can feed in an external signal. The trick is to get the correct output from the Pet to your hi-fi. Here is a simple drawing of the pins on the back of your Pet:
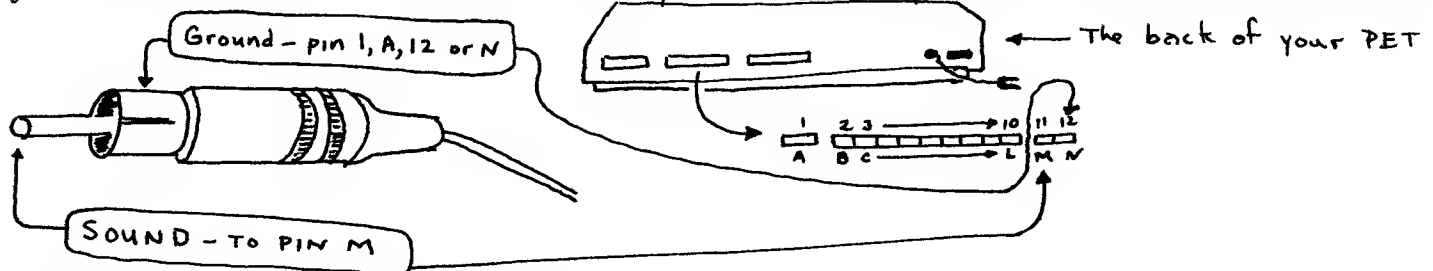
The best way to hook everything together is to use a "keyed" edge connector at the back of the Pet, and solder the correct lead from the cable that goes to the RCA jack to the correct pin. You can use other, rather flaky methods (alligator clips have been known to work), but the danger of accidentally shorting two pins together is nontrivial. Since pin 12 and N are directly opposite, a clip there gets you ground. If you insulate pin 11, (a piece of cardboard maybe?), you can put the other clip on pin M. Again: be careful, please.

CARDS... With this program you can create a tape that contains computerized flash cards, which the FLASH programs uses. CARDS is flexible, and quite easy to use. Since the directions on the tape are very comprehensive, we won't repeat them here. One comment, those dots that appear when you actually create the tape indicates that the Pet has written a block of data. Note: to change the maximum number of flash cards, change the variable MX in line 500.

FLASH... This program reads the tape that CARDS creates, and lets you review flash cards. You can "drill" yourself with either "side" of the cards, and of course it is a different order each time through. Both CARDS and FLASH make a distinction between upper and lower case: Ag is NOT the same as AG, okay?

ABOUT YOUR CURSOR TAPE

There is one copy of each program on the front side of the tape. As always, your tape head should be clean and demagnetized. Should you have trouble loading our programs, please return the tape to us Enclose a note explaining what the problem is and we will gladly send a replacement cassette.

CURSOR
Programs for PET™ Computers

"Ballet never becomes easy. It just becomes possible."
– Agnes de Mille

THE**CODE WORKS**

Box 550
Goleta, CA 93116
805-683-1585

A CURSORY GLANCE

The road to hell, it is said, is paved with good intentions. Well, 1 guess 1 know where 1'm headed, because 1 sure had good intentions about getting #4 out early! This one is so late that it is almost crazy to call it the "October" issue, but we will anyway.

We must have done something right with CURSOR #3, because we've gotten lots of very nice letters. Seems that lots of people tried the sound effect on QUIX!, and became addicted. Well, you ain't seen nothing yet! Glen Fisher has produced an outstanding musical cover this month. In fact, if you don't hook your PET up for sound for this issue, you will lose out on two programs: COVER! and CLOCK! See the Notes for CURSOR #3 for technical details on how to hook up sound (Pin M and 12 on the user port). Radio Shack sells a nice little 200mw Speaker/Amplifier, catalog number 277-1008, costs about $11, looks like a small radio. It comes with a short shielded cable - all you need is an edge connector for the PET, and two wires soldered to that connector. Hey, someone out there thought we meant for them to actually solder right to the connector that comes out the back. No way! You should buy the correct slip-on connector (female). It really should be "keyed" so it can only be put on in the correct direction; then you solder to the pins that come from this slip-on connector. Soldering stuff on the PET board has been known to cause the ghost of Chuck Peddle to cringe, even if he has defected to APPLE.

Thank you again for your support. We plan to start national advertising in the near future. Based on the best information now available, 1 expect that our subscription price will have to increase before too long. (Actually, my accountant is standing here with a .45 pointed at my head, forcing me to write these words.) We will try to maintain a very competitive price, but we need to allow for a bigger advertising budget; and we'd like a little more flexibility in what we can afford to provide to you. So, tell your friends that prices will be going up at the beginning of 1979.

SERIOUS USES OF SMALL MACHINES, Revisited

My comments about so-called "serious" uses of PETs and other creepy crawly computers kept the mailperson busy last month. I guess we must have struck a nerve: you go and spend about 800 perfectly good dollars for a nice looking little box. Your mother is impressed, your kids are impressed; but your spouse says "$800 would sure buy an awfully nice: (stereo, microwave, dishwasher, waterbed, used car, oven, etc)." But you say you were going to use your PET to keep your inventory or general ledger or payroll or whatever, right? Then you found out that it takes lots of storage, fast non-tape storage like double-density floppy disks, to store enough stuff for these applications to be practical. Then there is the little matter of "hard copy", and the sad story of the $595 PET printer that may never be built; or when it is available, it may cost $995.

OK, this all sounds kinda grim, and 1 think in some cases it is: people are being sold computers that just plain won't do what they need for a specific application. (My sources tell me that Radio Shack has this problem, and has put out the word to their dealers to "cool it" with over-enthusiastic but naive customers.) 1'd still like to hear from those of you who are doing honest work with these machines. Let me know, and 1'll be glad to share your experiences with our readers.

About the biggies: Texas Instruments will probably be ready about next summer. Please don't be surprised if they bring out a machine that has built-in reliable mass storage using "bubble memory". Also, expect to see both the Basic and Pascal as languages on the Tl machine. Or look for an lBM personal computer (not to be confused with their 5110, which is small, but expensive). lBM might emphasize the APL language. It is not clear that anyone at lBM even knows how to spell Pascal, much less market it.

CURSOR #4 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)
COVER04! A delight to your eyes and your ears. Notes dance around the keyboard as the three musical pieces play. Songs are: Wiltshire reel, the fiddle tune "Devil Dream", and a Sicilian tarantella. By Glen Fisher
BOP Chisanbop - the Korean technique of counting to 99 on your fingers. By Glen Fisher
CALC Everything you ever wanted in an $800 calculator. Hex, octal, decimal. Integer math only. By Glen Fisher
CLOCK! An $800 digital alarm clock that also chimes on each quarter hour. By John Fox
INP A short but powerful subroutine for use in your programs. Designed to be easy to merge with your code. Solves your input problems in elegant fashion. By Glen Fisher
CED The Cursor Editor. Allows you to enter, edit, save and load three screens of text. (Old ROMs only) By Glen Fisher

MORE ABOUT THE PROGRAMS

BOP... We use some "flashy" PET graphics to teach the Chisanbop method of counting. In Chisanbop, you press your fingers against a table to "make a number". Your right fingers are each "worth" one; your right thumb is worth five. Your left fingers are each worth ten, and your left thumb is worth 50. There are four options; all are obvious except the one in which you "set" the fingers to produce a number. Use ">" to move the pointer to the right, and press RVS to change a finger. When you have all the fingers set, type [RETURN] to let the program know you are done.

CALC... This calculator has a display where you enter the number, and it has an "A" register where the results of each operation are stored. CALC also has a single "memory": you store numbers by pressing [S], and recall numbers by pressing [R]. There is a global number base, which starts out as base ten. You can change it by pressing the [#] key, followed by [H] for hex, [O] for octal, or [T] for base ten. To convert from one number base to another, set the global base as the base _to_ which you want to convert, and then use our "local base" feature to enter the base and number _from_ which you want to convert. You do this by simply prefixing the number with the appropriate base (e.g. to enter a hex number when the global base is set to decimal, type [H255] then an equal sign). You can use addition, multiplication, division and subtraction in the obvious fashion. Other operations:

[DEL]	Clear entry
[INST]	Clear all registers
[#H]	Set global base to hexadecimal. (#O for octal, #T for decimal).
[S]	Store contents of the A register in memory register
[R]	Recall memory
[HOME]	Change sign of entered number
[^]	Copy the A register down to the display
[<]	Show value of the high byte of the A register
[>]	Show value of the low byte of the A register
["]	Peek at the _word_ at the location given by the A register
[']	Peek at the _byte_ at the location given by the A register

CLOCK!... This one is pretty self-explanatory. Set the time in four digits and press [RETURN]. You can have music on command by pressing "!", and chimes by pressing "<". Alarm music is, appropriately, "Reveille".

INP... As many people have noticed, the INPUT statement has several undesirable features: it won't accept commas or colons as input (even for strings!); it prints nasty messages at you if you type too much; it can only accept 80 characters of input; and it will drop you out of the program if you type nothing but [RETURN]. INP is our answer to those problems. INP lives at line 60000, and can be called upon to do input for you at any time. It is explicitly public domain, so you can use it freely in all your programs. (We ask only that you include an REM saying, "INP routine used with permission of CURSOR, Box 550, Goleta, CA 93116".)

There are two parts to using INP: adding it to your program, and using it once it's there. As it must be part of your program before you can use it, we'll describe that first. The steps to follow to add INP to your program are these:

1. Save your program, if necessary. (We're about to erase it from memory!)
2. Load INP into your PET.
3. Position tape that has your program on it just before the program starts.
4. Clear the screen, and LIST the INP routine.
5. Move the cursor to right over the word "READY". Type "LOAD" (notice the two trailing blanks). _Don't_ press [RETURN] yet. First, press [PLAY] on the recorder; _then_ press [RETURN].
6. After your program has loaded, press [HOME] to get to the top of the screen. Now, press [RETURN] 12 times (once for each line of INP).
7. Now, save the results on another tape. (This all _sounds_ hard—it isn't.)

INP Routine, continued: There are two more things that must be done for INP: Assign CHR$(13) to the variable CR$; INP prints out whatever is in CR$ when [RETURN] is pressed. Setting CR$ to CHR$(13) makes the cursor go to the next line when [RETURN] is pressed. (If you assign " " to CR$, the cursor won't move when [RETURN] is pressed.) Also, if you've got a PET that types upper case when in lower-case mode, set the variable FL to 1. This makes INP switch upper and lower case on input, so that you'll get upper case only when you press [SHIFT]. (Keep in mind that your lower case is a newer PET's upper case, and vice versa.) Finally, beware of using variables whose names start with the letter 'Z'. INP's private variables all have names starting with 'Z', in an attempt to avoid your using any of your variables accidentally. (If you don't care if INP mangles one of your 'Z' variables, feel free to use them. Just keep in mind that INP may use them, too.) Also remember that INP uses FL; if you change FL, INP may start acting a little oddly (it happened to us, it can happen to you).

Now that that's all done, we can do input! Whenever you want to input something, PRINT your prompt (with a semicolon at the end!), and GOSUB 60000 to do the input. When INP returns, the variable IN$ will hold the string that the user typed in. For example:

```
10 CR$=CHR$(13)
20 PRINT "WHO'S PLAYING AGAINST ME? ";
30 GOSUB 60000
40 PRINT "OKAY, ";IN$;", YOU'RE GONNA GET TROUNCED!"
50 BLACK$=IN$
```

Note that the PRINT printed a question mark. INP itself prints no prompts of any sort. It just sits there blinking a grey square at you. (It shows a grey square so you can tell it from an INPUT statement.) You'll find that INP won't accept anything that isn't visible (that is, [UP], [RIGHT], [RVS], [HOME], and so forth). However, it will let you correct mistakes: if you press [DEL], the last character on the line will be deleted. Pressing [SHIFT-RETURN] will throw away everything you've typed so far, so you can start over. To tell INP that you're done typing, press [RETURN]. (Those three keys act the same way as they do for the INPUT statement.) The usual troublemakers (quotes, commas, and colons) will cause you no problems at all. INP will calmly hand them back to you in IN$.

CED... (Old ROMs only!) With this simple little text editor you can enter and modify three PET pages of text at once (well, you actually work on a page at a time, but they are all available to you). When you first run the program, it will tell you that it is off doing some work. When it is ready for you, it will display the little "checkered flag" cursor. To enter the text, just type it in. The cursor control keys all work, except the [CLR] key which has been disabled to protect you from wiping out a bunch of typing by accident. ([CLR] does provide a home-to-left-lower-corner function, however.) [INST] and [DEL] insert and delete text. [DEL] works on the character under it, instead of the one to the left, as the PET does. These keys affect the entire page of text (i.e. lines will wrap around, etc). There is also a "local" or line-oriented insert key, the " " key, and the "backarrow" is the line delete function.

To give commands to CED, press the [pi] key " ". The program will store away the first line of text, and then give a number, followed by a colon (e.g. 2: means "You are working on page 2"). You can press [RETURN] and go on typing or you can give a command.

COMMAND SUMMARY FOR CED

[S]   **SAVE** a file. It will ask you for a filename. BE CAREFUL ABOUT WHAT TAPE IS IN THE DRIVE!

[L]   **LOAD** a file. If you can't remember the name, type [RETURN], and it will automatically load the next file on the tape.

[D]   A shifted [D] puts you in graphics mode. Unshifted [D] gives you upper-lower case.

[PI]   The pi key first gets you into command mode. Then, if you press it again, you can redefine this "escape to command level" character. The only reason to do so would be if you wanted to enter the pi character as part of your text.

[QUIT]   Does just what it says. You are warned to save your file if you haven't. (You get one chance. After that we assume you are a big kid and know what you are doing!) It is quite important that you only quit via the [Q] command. Otherwise, turn your machine off, then turn it back on to clear some pointers that we diddle with. Or you could type: POKE 134,0: POKE 135,32. Also, if you want to re-run the CED program without reloading the tape, type [CONT] rather than [RUN] after you have quit. Otherwise you will get an "out of data" error.

[NUMBER] At the command mode, you can go to another page by just typing the number of that page. So, if you have typed all of page 1, and want to type on page 2, then you would type [" "], followed by [2].

[CLR]   At the command mode only, [CLR] will clear your screen. (We made it hard on purpose — we sometimes need to be protected from ourselves.)

HACKER HINTS

You can "escape" from our fancy input routine INP by pressing the [RUN] key. [STOP] doesn't work, however.

As every PET programmer knows, Commodore didn't provide a DELETE command to get rid of a bunch of lines. You can use a little one-line program to help solve the problem. Say you want to get rid of lines 10 to 100. Type: FOR I = 10 to 100: STEP 10: ?I: NEXT. It will print a bunch of numbers on the screen. Just press [HOME], then hit [RETURN] about 24 times, and you won't have near as many lines to kick around.

After you read a tape, you can find out how much trouble the PET has reading your tape by telling it to print the number of "drop-out" errors it encountered. On "Old ROMs", type: PRINT PEEK(630). On Basic 3.0 or 4.0 ROMs type: PRINT PEEK(192).

If it says zero, you had a perfect load of the tape. Otherwise, divide the number reported by 2 to get the number of tape drop-outs. We find that anything over 8 will be a problem. (It doesn't have to be zero, however. The PET recording method puts two identical copies of your program on the tape. Since there are two copies, a certain number of errors can be corrected by the PET as it loads your program.)

A CURSORY GLANCE

We are calling CURSOR #5 our "November/December" issue. We got hopelessly behind in our production schedule, so we decided that a two-month issue was the one rational way to play "catch-up". Of course, you will still receive a full 12 issues of CURSOR, but the last issue of Volume One will be July rather than June of 1978. CURSOR #6 will be out sometime in January (and that is the only New Years resolution I've made...)

Beginning February 1, 1979 our subscription rate for 12 issues will become $33/year in the U.S. and Canada, and $48/year for Foreign subscriptions. Even with this increase, CURSOR remains the best value by far in the Pet software marketplace. (About fifty cents a program!)

The new subscription price represents a more realistic evaluation of our costs. Fortunately, we control our own tape duplication, and have been able to keep those costs down to a minimum. However, our cost of doing business has continued to increase, and our introductory price of $24/year was based on some very tentative "back of the envelope" estimates of what it would cost to produce a monthly cassette magazine for the Pet.

UPDATE ON THE OSBORNE BASIC PROGRAMS

I blew it! I advertised something that I did not have in hand, but expected to receive before orders arrived. As any of you know that mailed an order for the book and cassette tape of SOME COMMON BASIC PROGRAMS, I have already returned your checks with a note explaining what happened. Here is the current status: I have a supply of the excellent book SOME COMMON BASIC PROGRAMS, but the cassette tapes will not be shipped to me until the first week of February. The good people at Osborne have had some difficulty getting reliable duplication of Pet tapes, which is not uncommon in this field.

If you are looking for useful programs for the Pet, this book is the best source that we have found. Unlike certain rather expensive "ripoff" books that are simply listings of poorly documented programs, this volume has excellent explainations of each routine. There are about 80 programs in all, with many statistical applications, as well as business and math programs. Available from Osborne/McGraw Hill, Box 2036, Berkeley, CA 94702.

THE BASIC HANDBOOK by David A. Lien

This excellent book is organized alphabetically by Basic keyword. Each of about 250 keywords (such as GOSUB, IF, PRINT) is covered in a page or so of text, with a short test program that gives an example of how the keyword is used. The HANDBOOK will be very helpful when you are trying to convert a program written in a different version of Basic to the excellent Microsoft Basic that Pet uses. Available from: Compusoft Publishing, Box 19669, San Diego, CA 92119 (ISBN #0-932760-00-7).

CURSOR 5 HAS THESE PROGRAMS: (Programs ending with '!' use CB2 sound.)

COVER   We present a "naked" Pet keyboard! When you press a key, (or a combination of keys), it won't perform its normal function! Instead, a pattern will appear on the matrix displayed on the screen.

HANOI   Excellent animated version of the classic logic puzzle. By Glen Fisher

SHOOT   You shoot a gun at a falling target. Not as easy as it looks! By Gary Bainbridge

BSHIP   A super game of Battleship. You vs. Captain Pet. By Howard Arrington

FACE   Become a police artist! You (and your faithful computer) can draw almost any sort of face. By Glen Fisher

HMAN   The word game "Hangman" (without those ugly gallows...) By Glen Fisher

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MORE ABOUT THE PROGRAMS

HANOI... This puzzle is a classic excercise in logic. There is a pile of disks which you must restack at a different spot. There are only two rules: you can only move the top disk at any given turn, and a larger disk may <u>not</u> be placed on top of a smaller one. You can choose to work with a pile that has anywhere from two to seven disks. After you are done, the program will report the minimum number of moves that was possible. (The animation effects in this program are superb!)

SHOOT... This little game is simple but lots of fun: you try to fire a gun at a falling target. You select your skill level on a scale from 1 to 5. If you are an ace fighter pilot, you may be able to get 9 out of 10.

BSHIP... A great battleship game for you! The program is so long that there wasn't enough space for program instructions, so you will need these notes while you are learning the game.

After you enter your name, you set up the positions of your ships. The location you enter is a two-digit number. The first digit is the row (beginning with row 0), and the second digit is the column (again, begins with zero). Next, enter the direction that you want the ship placed. These are relative to the [5] key on your keypad. For example, direction [8] is "up", direction [4] is "left", etc. If you enter anything incorrectly, the line is erased and the location and direction are asked for again.

If you realize that you've mistyped the location after you hit [RETURN], just press [RETURN] when asked for a direction, and then you will be asked again.

When all your ships are placed, the screen will be erased and two boards and some rows of asterisks will be drawn. The boards record the shots that you (and Captain Pet) fire at each other. There are four rows of asterisks, one per ship, with one asterisk for each square in the ship. Whenever a hit is made, the asterisks will be replaced with the letter of the salvo that made the hit. To fire a shot, just type the row and column of the square that you want to shoot, entering the position just like you did when placing your ships. Initially, you have seven shots. If you lose your battleship, you lose three shots. The cruiser is worth two shots and the patrol and destroyer are one shot each.

After you have fired all your shots, the program will tell you how well you did by replacing the asterisks representing the ships with the letter of the shot that hit that ship. WARNING: to make things a little tough on you, the list of hits does NOT show the position on the ship that a given salvo hit. For example, with the battleship, you might have the following: AC*** The "A" hit and the "C" hit are not necessarily next to each other! (They could be at opposite ends of the ship...) When the Pet puts shaded squares on the screen, it means that it has decided that it is impossible that any ship is at that location.

When all the ships of either player are sunk, the game is over. The Pet says who lost, and then shows all the ships (in reverse video). To play again, erase the screen and type RUN.

FACE... Police "composite portraits" have always fascinated me. You know, the victim goes through a book and selects eyes, nose, mouth, etc. with a police artist. Well, here is a computer version. This program has not been tested by any of the major crime labs.

FACE is an interesting program to change. The DATA statements that begin at line 20010 describe the eyebrows. There are two numbers on each data statement. The first is the number of rows that the facial feature requires, and the second is the number of columns or print positions that it takes. If you come up with some new features, please drop us a note so that other readers can share your creative genuis!

HMAN... A very nice implementation of "Hangman" the a word guessing game. The vocabulary is given in DATA statements that begin at line 30000. It is easy to add your own words, and perhaps remove some of of the more obscure words that we have included for your enjoyment.

NOTES FOR CURSOR 6
January 1979
Ron Jeffries, Publisher
Glen Fisher, Editor

CURSOR™
Programs for PET™ Computers

"Modern man is the victim of the very instruments he values most."
– Lewis Mumford

THE **CODE WORKS**
Box 550
Goleta, CA 93116
805-683-1585

A CURSORY GLANCE

Thank you! Our mail continues to bring nice letters from happy subscribers. Sure, we have had a few complaints, but generally people are very pleased with the software they receive (although they would like to get it a little sooner). 1 read most of the personal mail myself, even when 1 don't have time. Whenever possible, I try to jot a quick reply. By not bothering to have my letters typed, I save quite a bit of time and effort.

SOFTWARE REALITIES

1 want to thank each of you for the support you have given CURSOR. Although there is no way to know, several subscribers have mentioned that they believe that very few people are making "freebie" copies of CURSOR. Consider this excerpt from a letter:

"1 belong to the Mid-Peninsula PET Users Group...Your magazine was discussed at the last meeting and it was unanimously decided that no portion of it would be allowed in our library for the purpose of copying as we know that this would hamper your circulation. The purpose of our users group is the free exchange of software, but we would not wish to undermine a fine publication such as yours".

1 want to thank the members of the Mid-Penisula PET Users Group for recognizing this issue of software copying, and stating a clear policy. I'm sorry to say that 1 also know of a group of PET users associated with a large firm in Southern California where a single person subscribes to CURSOR, then distributes programs to the group. Here are some thoughts about the issue:

Software publishers such as CURSOR, CLOAD, (Published for the TRS-80 by my friend Ralph McElroy), Creative Computing, Personal Software and Kilobaud and a host of garage operations all face a common problem: how much to charge for a single program or a group of programs. The CURSOR/CLOAD approach has been to price our software magazines quite low, and develop a high volume. The low price discourages most people from going to the trouble of making illegal copies for their friends.

What we don't know is how many people will rip us off regardless of how great the product is and how low it is priced. My subscriber at the large aerospace company evidently doesn't realize the long term impact of his actions. Each subscription that we don't sell because of a rip-off copy is one less subscription over which the fixed costs of our operation can be spread. At the limit, software for personal computers may not be a feasible product until Texas Instruments comes out with a ROM-only method of distributing software. However, I think that the consumer is better served by small companies such as CURSOR that are trying to produce high quality software for the mass market.

The bottom line is simple: at your next User Group meeting, bring up the problem of copying software that is commercially produced. And thanks again to the vast majority of you that already respect the effort we are expending to put out good software at a low price.

CURSOR 6 HAS THESE PROGRAMS: (Programs ending with '!' use CB2 sound)	
COVER6	Let this programs graphic design by Jim Hinds run for a few minutes to see an interesting pattern.
BOX	Howard Arrington wrote this simulation of the Parker Brother's game "Black Box". One of the more difficult logic games we have seen – be prepared to spend a few hours testing your brain.
BJACK	John Melissa wrote this game from his home town of Las Vegas. Double down, take insurance, bet your paycheck!
PACK	If you write large Pet programs you will appreciate this handy routine that eliminates all blanks from your BASIC programs.(Old ROMS only)
LIST	But what if you need to look at that PACKed program? LIST to the rescue, with blanks inserted, line numbers aligned, and the best of all, cursor keys shown in the standard "spelled out" form, e.g. [DOWN], etc. (Old ROMS only)
CEDPR	Prints files produced by the CED Editor in CURSOR #4. (Old ROMS only)

MORE ABOUT THE PROGRAMS

BOX... This game may warp your mind. Well, at least you will probably waste several enjoyable hours with it. The idea is quite simple: in front of you is a black box with several (you decide how many) atoms hidden inside. In your laboratory you inject "rays" at carefully chosen locations, and observe the results. The rules about what happens to a ray that passes near an atom are a bit complicated. And of course, after one atom has its effect on the ray, it may then pass near another atom which will again change its direction. I think you will want to have the Parker Brothers game beside your PET in order to get the most fun from our game. (That may sound odd, but actually, their game is much more fun when played with a computer than when played on a board. Author – Howard Arrington. Edited by Glen Fisher.

BJACK... As I wrote these notes, I played another quick game to remember how this program works. At one point I was playing very agressively and was ahead $20,750. My wife Jann suggested that I quit playing and take the money home. Instead I bet $20,000. And lost!

In this version of Blackjack you can double down and can buy insurance. Due to default values that were carefully chosen, it is easy and fun to play. For example, you can repeat your most recent bet by just pressing [RETURN]. John Melissa wrote the game, Glen Fisher edited it.

PACK and LIST... are a pair of handy routines. PACK takes all the blanks out of a program (except those in REMarks and inside of quotes), and so can save quite a bit of space when working with a large program. After it is loaded, type: SYS(826) to use it on whatever program is in memory. (Old ROMS only).

LIST does a couple of nice things for you. For one thing, it lets you read those programs that have all the blanks squeezed out! In addition to putting the blanks back in, it lines up the line numbers and also translates the cursor commands into the notation used by several magazines when they print listings of Pet programs. NOTE: LIST uses the top two pages of your Pet's memory. If you use the LIST program, then want to load and use a different program, type: POKE 135,32 which tells the Pet that it has all of its memory back.

CEDPR... is a print program that lets you list one or more CED files (see CURSOR #4) on a printer. We use the CMC PET ADA 1200 adapter, and a DECWRITER II. The CMC adapter works like a charm (although it is too bad that they didn't make it easier to change the speed or "baud rate".CEDPR is rather slow, as it is written in Basic. (Old ROMS only).

NESTAR SYSTEMS

NESTAR Systems of 810 Garland Drive, Palo Alto, CA 94303 has developed what promises to be an exciting new capability for small computers. They have designed a system called CLUSTER/ONE which acts as a master controller and disk resource for up to 15 Pet computers (you can also use Radio Shack TRS-80's or Apples). Programs and data files are shared among the users of CLUSTER/ONE. They are stored on floppies that are attached to the central computer. They claim that system response time for program loading is typically two seconds!

CHANNEL DATA BOOK

If you would like to have a single well organized source of information about Pet software and hardware, consider the Channel Data Book. It is a looseleaf binder with tabs for the major catagories such as: Software, Hardware and peripherals, Pet literature, and listings of some 1000 Pet programs! You get regular updates as part of your purchase price, and easy to follow instructions for filing new, revised material. (Channel Data Systems, 4141 Hollister, Goleta,

A CURSORY GLANCE

A CURSOR subscriber who recently had an operation for throat cancer needs your help. Due to the operation and quite a weight loss, he is no longer able to use a vibrator "talker" unit. He has heard of a board that produces words by pushing buttons. If any of you have heard of such a device, or have friends that might know where to get good current information, please get in touch with CURSOR right away, and we will pass the information along. Currently, he is only able to write things down, and of course finds that mode of communicating to be terribly restrictive.

When we think ahead a bit about where the small computer revolution is going to take us in a few years, I think that the potential for devices to help the disabled will be a very important area. I have no illusions about 8K Pets solving all the problems of the disabled, but there may be an important side effect: far more people will know something about computers and the type of problems they can solve (as well as the problems that they create). The Junior High down the street from our office has two Pets, and a dedicated math teacher who is turning dozens of kids in the 7th and 8th grades on to the joys of computing. 1 believe that this coming "wave" of sophisticated computer users will be far more important than the most exciting hardware development you can imagine. People solve problems, and computers are only fancy tools. In the past, these powerful tools have only been available to a very small fraction of our society. Now, anyone with about $800 burning a hole in his/her wallet can walk home with a remarkably powerful machine (even with all the warts that a Pet or TRS-80 has). And, very simply, once people have experienced the possibilities of computing, the world just ain't going to be the same!

SOFTWARE ETHICS REVISITED

Our little article in the Notes for CURSOR #6 brought some interesting mail. Basically, many people support the idea of high-quality, reasonably priced software. Example: "Never fear that someone is going to get a free tape out of me for the prices that you charge, (and the QUALITY!!)."

All I can say is "Thanks!" Incidentally, l'd like to pass along whatever information we have about other good products. Personal Software has a very good Chess program as well as a Bridge program. Their software is well done, and they are a good company with which to do business. If you find any "turkeys", and are willing to have a letter with your name and address published in CURSOR, then let us know about the poor software that you have run into. Naturally, since we sell software, we are probably not the best judges. Well, we know junk when we see it, and there is some real junk being sold!

CURSOR 7 HAS THESE PROGRAMS: (Names ending with "!" use CB2 sound)
COVER7   A kaleidoscope pattern by Ken Matthews.
PRICER   A cost estimation program, designed for contractors who bid on government work. By Glen Fisher.
SOUND!   The CURSOR sound effects library: French Police, lasers, even birds. By Ken Matthews.
MIND   The Mastermind puzzle: try to guess a pattern of four colors. By Glen Fisher.
FBALL   Football on your Pet: play another player, or try your skill against the machine. By Mark Pelczarski.
PAPER   Yes, you too can be a famous wallpaper designer. By Ralph Dufour.

MORE ABOUT THE PROGRAMS

PRICER... This program is designed for use by a government contractor, but the problem that it solves is quite general. If you have to estimate costs for a job, and you have an overhead rate, a general and accounting "G&A" rate, and a fee or profit, then PRICER can remove some drudgery from your life.

The program on your Cursor tape will need to be customized for your business by changing some DATA statements, then saving the program on another tape. The DATA statements are only changed when the salary of employees changes, or when you add or "subtract" staff.

At line 40000 there is a set of DATA statements, one for each employee. Each line has four variables:

INITIALS Enter the initials of the employee.

NAME The name of the person. If you want to maximize the amount of information that this program can handle, don't spell out the first names.

AMOUNT How much the person is paid, either annual salary or hourly wage.

TYPE HR=hourly person, YR=salaried.

The table ends with a line that has three commas in it. At line 41010 is another DATA table that you can customize. It has the prompts for what are known as "Direct Costs". End this table with two quotes. Finally, at line 42000 is a table of the months of the year. At some sacrifice in readability, you could shorten the spelling to three letter abreviations in the DATA statement and save a few more bytes. (If you get the feeling that this program is very short on memory, you are correct!) You can also remove the directions at lines 62020-62060...

A nice feature is that when the program asks you who will work on the job, you can type a question mark and it will print the current table of employee data. Another comment for non-government users: when the program shows "loaded" figures, it has taken the amount actually paid to the employee, added the overhead percentage, then applied the G&A to that number. Finally, the profit is applied to the entire amount.

SOUND!... A wonderful sound effects library, written by Ken T. Matthews. You will need to attach a small amplifier to your Pet as we described in CURSOR Notes #3 (Ground is pin 12, sound is pin M).

Due to a suggestion from a subscriber, we are adopting a new convention: all programs that have sound from here on will end with an exclamation point, as in "SOUND!". If you have not yet gone to the trouble to hook your Pet up for sound, you are really missing a great feature.

MIND... Glen Fisher has done it again: there may be many versions of the game of Mastermind, but you probably won't find a better implementation than this super program. Now, if the Pet just had color...

FBALL... Mark Pelczarski wrote this very nice game of Football. You will want to have the following handy when you play:

OFFENSIVE PLAYS:

| 1-Run | 2-Sweep | 3-Screen Pass | 4-Long Pass |
| 5-Punt | 6-Field Goal Attempt | | 7-Time Out |

DEFENSIVE PLAYS:

| 1-Hold | 2-Normal | 3-Blitz | 4-Intercept Pass |
| 5-Punt Return | | 6-Block Kick | 7-Time Out |

PAPER... You don't need complicated directions for this neat little program. One warning: please don't use quotes in your pattern, as the program doesn't like them one bit!

SKYLES ELECTRIC WORKS

I recently purchased the 8K memory expansion board from our friendly Pet dealer. (Always buy from a dealer if you can: it gives you someone to yell at if things go wrong. Also, you can see things before you buy them). So far, my experience with the Skyles board is good, which means that it was easy to install (took me about 15 minutes, and I am very slow). I like the fact that it fits inside the cabinet of the Pet, and that it seems to be well made. The only critique I can offer is that the directions don't mention the danger of hooking the power up backwards, which I imagine would do violence to your machine!

A final note: adding 8K additional memory makes a LOT of difference in the type of programs that you can do on the Pet. So often, 8K is a serious limitation (for example, PRICER in this issue was quite hard to fit into 8K). Soon, memory will be much cheaper, and 16k Pets will be the rule rather than the exception.

NOTES FOR CURSOR 8
March 1979
Ron Jeffries, Publisher
Glen Fisher, Editor

CURSOR™
Programs for PET™ Computers

"The Titanic was built by
professionals. The Ark
was built by amateurs."

THE **CODE WORKS**
Box 550
Goleta, CA 93116
805-683-1585

A CURSORY GLANCE

Several CURSOR subscribers sent information about devices that may help our friend who had surgery for throat cancer. We have forwarded the information, and want to say "Thanks" to those of you who took time to dig out the information.

Commodore appears to be alive and well! The new PET with the "real" keyboard has been shipped over a month earlier than promised. The new keyboard has a fairly decent "feel", although it certainly doesn't compare with an IBM Selectric! The RETURN key seems small (it is not as big as the Shift keys), but overall I like the layout of the keyboard. The keycaps have molded-in letters, so that they wont wear off. On the model that I used, the graphic symbols are on the front of the keys. There will also be a business model that won't have the graphic symbols shown on the keys. The machine language monitor is now in ROM, so that you don't have to load it in from cassette. The new machines also have a new set of ROMs, and it looks like most of the "bugs" in Basic have been fixed.

And now for the bad news: Commodore decided to make a major change where you Poke the Pet into upper and lower case mode (POKE 59468,14): the new ROMs give you unshifted lower case and shifted upper case (as you know, with the older machines it works the opposite way). We haven't had enough time to find many other things, but we do know that some of the changes will affect at least some of our programs. By the next issue of CURSOR, we hope to have much more complete information for you. (Some of the changes will cause problems for all programs that do any fancy stuff with the Pet operating system.) Commodore plans to provide "retrofit" Roms sets for the old 8K Pets that will replace the Basic and operating system, but probably won't change the character generating chip.

The new Pet has a redesigned board inside, with a number of changes. For example, the memory expansion port no longer comes out to an edge connector. Instead, there is a different style of connector inside that looks similar to the connectors that Heath is using in their H8 computer. (With the new board, you can have 32K of memory onboard without a memory expansion board. If you buy a 16K version, you can't expand to 32K by just adding a few chips. Instead, you take out all the 8k chips used for the 16K machine, and replace them with 16K chips used in the 32K version!)

Maybe, just maybe, Commodore may still be able to capitalize on what is basically a very well-designed computer. There are two remaining pieces: disks and printers. The Commodore disk has very nice features, and stores about twice as much data as the Radio Shack disk. The latest word on printers is quite hopeful: Commodore is using a tried and true printer mechanism from Japan that will provide good quality print and will support the Commodore graphics! If they can get these products out the door in quantity, we will see some real competition between Commodore, Apple, and Radio Shack (although I certainly won't discount Atari and Texas Instruments...).

OSBORNE ASSOCIATES - "SOME COMMON BASIC PROGRAMS"

One of the best values in Pet software is the tape and book from Osborne called Some Common Basic Programs. There is not a single game or amusement on the tape, just nitty gritty useful programs that are well documented in the book. Each program name is the page number of the book where you will find a listing and an explanation of how the program works. The tape and books are available from your local dealer, or from Osborne Associates, Inc., 630 Bancroft Way, Berkeley, CA 94710 USA.

CURSOR 8 HAS THESE PROGRAMS: (Program names ending with "!" use CB2 sound)	
COVER	The Pet weaves patterns on the screen. By Glen Fisher.
REVERS!	The game of Reversi: you against the Pet, or another player. By Glen Fisher.
DBOOK	An easy-to-use date book for birthdays, etc. By Glen Fisher.
SPACE!	Fly your Pet into deep space as you pursue the enemy. By Greg Erker.
MAZE	You must find all the hidden gold in the maze. By Howard Arrington.
ADD	Great addition drill that makes the magic of "carrying" clear. By Donald Ross.
X	A "skeleton" of routines to use when you submit programs to Cursor.

MORE ABOUT THE PROGRAMS

Program names that end with the exclamation mark "!" use the Pet's CB2 sound on pins 12 and M of the user port. See CURSOR 3 for a diagram of how to hook up sound. (We like sound, and design many of our programs to use it. You won't get the full effect of our programs without sound!) If you somehow hit the [STOP] key when sound is generated, you can stop the sound by typing "POKE 59467,0".

REVERS!... Reversi is a board game that has been popular in recent years under the name of "Othello". For an excellent reference, see the Mathematical Games column by Martin Gardner in the April, 1960 Scientific American. In this version, you are able to play against the Pet, or another player. You are asked if you want sound. (If you want sound, you'll need to attach a small amplifier to your Pet. See the diagram in Notes for CURSOR 3. Reversi is a game that is quite easy to play, but is hard to describe! Each player gets to place one "counter" (as in checkers), on the board in turn. You move your piece by using the numeric pad (8 is up, 2 is down, 4 is left, and 6 is right). When you want to put the counter on the board, press [RETURN]. If you place it at an illegal position, the Pet will refuse the move. Basically, you have to put the counter beside one of the opposite color, where you also have a counter at the opposite end of the row. When you do so, you "capture" all of the intervening pieces (at least until the Pet decides to capture them back). If you can't make a legal move, then press [SHIFT] and [RETURN] at the same time. The Pet does not play a brilliant game, but it isn't all that easy to beat either!

DBOOK... This is a simple, special purpose database program that will help you create, sort, list and save a file of peoples names and important occasions, such as birthdays and anniversaries. There are 9 commands, most of which are self explanatory.

ADD   Used to enter or add information. You are prompted for each item. For the "OCCASION", there are three built-in options, which are displayed if you type a question mark at that prompt. If you enter the codes for birthday (1) or anniversary (2), the information is stored as a code, and uses very little space. However, you can also enter some other occassion with the code of (3), and then you will be prompted for a description of that event. To return to the Command level, type a [RETURN] to the "NAME:" prompt.

CLEAR Does just that: it clears all names from memory.

DUMP   Shows you all the information, in the actual order that they are stored in the Pet. Also tells you the id number for each name, which can be helpful when editing.

EDIT   Slightly misleading, since what you can do is replace an entry, or delete it. Edit will ask "CHANGE?", at which time you should type a question mark to learn the options available. ([Y]=yes, edit this person; [N]=no, go on to next person; [Q]=quit editing; [D]=discard this entry; entering a number will take you to that persons entry for editing).

LIST   After you have sorted the list, you can list it. Note that in the sort you can be selective about which entries you want to see.

LOAD   Once you have saved a file (see SAVE below), you can bring it back into the Pet with the LOAD command. If you can't remember the filename, then type a question mark when asked for the name. If you don't want to load a file after all, press [RETURN] when asked for the filename.

QUIT   Guess what, this command says "I want to quit". If you have entered names, but haven't yet saved them, you will get one warning.

SAVE   This command saves the data that you have entered with the add command onto tape.

SORT   You can sort by date or by name. In both cases you are asked for beginning and ending ranges. If you press [RETURN], it defaults to everything. However, if you only want dates in March and April, you can indicate that! Note that the LIST command only displays the results of a SORT. So, if you sort on names from A to G, list will not show you anyone whose name starts with H or beyond in the alphabet.

SPACE!... You pilot a space ship, using the numeric pad. Pressing the [SHIFT] key fires the laser. For the sound effects, you'll need to use a small amplifier as described in CURSOR 3 (Ground is pin 12, sound is pin M).

MAZE... The Pet draws a maze, then hides gold. You have to find the gold. (There is just one small difficulty: after the gold is hidden, the maze disappears from view. You have to feel your way around the screen...)

ADD... This program takes the mystery out of the "carry" problem in addition. If you teach, or have young childern, this will be a useful addition (no pun intended) to your program library.

X... This is what we use when we start to write a program for CURSOR. It includes the "standard" stuff that we always want to have in a program. If you are submitting programs to us, we'd like to encourage you to use this skeleton". Note that "X" is not a program, so don't try to Run it. It is just an easy way to start a program with the "CURSOR stuff" already in it.

A CURSORY GLANCE

Commodore is shipping the model 2040 dual floppy disk system for the Pet. You should know my biases before I evaluate this new product: Cursor is a software publisher. We (currently) publish programs for only one personal computer – the Commodore Pet. Naturally, it is in our best interest for Commodore to thrive, for each new machine that they sell represents a potential new subscriber for us. As of April, 1979, there are only three personal computers that appeal to a mass market: Apple, Radio Shack and Pet. In certain respects, Commodore has better features than the other two, including a very nice screen editor, pretty graphics (although not in color), and a reasonable operating system and Basic. The small keyboard on the 8K Pet was probably a mistake, although not near as bad as some TRS-80 enthusiasts would lead you to believe. Back to disks: the TRS-80 has had disks available for months, while Pet owners were limited to cassette tapes. But a wonderful disk system was being designed and soon we were to benefit from the greater care that Commodore was taking in its design. For example, the TRS-80 disk holds about 90,000 characters on one diskette. Commodore stores about 170,000 characters on the same 5 inch diskette.

Based on my limited experience with the Pet 2040 disk system, I think they screwed it up very effectively. I think I know why, too: when the Pet operating system was designed, they were in a big hurry to get it out the door, so that they could sell lots of machines. They didn't put any "hooks" into the main operating system for the disk system. After all, they had the IEEE-488 bus, right, and everyone assumed that their disk system problems were solved. Well, their disk box does hang on the 488 bus, and it does have a lot of smarts all its own. There are two microprocessors inside, (one of them is a 6502, just like in the Pet). The disk box has its own local RAM memory (which is nice, since the disk system doesn't use any of your precious memory in the Pet). But there are costs to the disk system being completely separate from the host computer. Worst example I can give: you have to write a short Basic program to find out what error you got when the disk system fouls up. In fact, the only way that you know that a disk error happened is to look at the error LED on the disk unit. There is no message on the screen!

Why did I buy the bloody thing? Well, it speeds up my work a lot. As an example, the program GAMMON in this issue loads in about seven seconds, and CIRCLE loads in about four seconds. If the 2040 disk system proves to be reliable, Commodore will sell a lot of them. One last "gottcha": the new disk does NOT work with the old ROMs! Well, since they fixed a lot of problems with the new ROMs, that doesn't bother me, as long as they provide the new ROMs at a reasonable price. (Remember, your hardware had a warrenty, but the software i.e. ROMs did not!) There seems to be a small problem: the new ROMs will not be available until mid-July for the older Pets. (If you bought your pet before February of 1979, you have an old Pet.) Sigh!

CURSOR 9 HAS THESE PROGRAMS: (Programs ending with '!' use CB2 sound.)	
COVER9	A spiral pattern designed by Ken Matthews.
YAHTZEE	The game of Yahtzee for one to four players. By Glen Fisher.
SLOT!	The Cursor Casino, with sound! By Mark Heaney.
FLIP	A utility to help convert text in programs from old to new ROMs. By Glen Fisher.
CIRCLE	Great circle navigation: How far is it to... Program by Martin Mabee
GAMMON	A very good 16K game of Backgammon – you against the Pet. By David Malmberg and Glen Fisher.

"Everything is deeply intertwingled."
– Theodor H. Nelson

MORE ABOUT THE PROGRAMS

YAHTZEE... Up to four people can play the YAHTZEE, with all of the scores being displayed in an easy to read fashion. The game is very close to 8K, so the instructions are very short. When the game begins, you first enter the names of the players. To roll the dice on the first roll you press [RETURN]. When you see what you rolled, you can selectively roll dice by typing the value of the dice you want to roll. For example, if you type "263", it will roll the dice that have that value showing. If you want to roll more than one of a given value, then type it as many times as you want dice rolled. Example: you first roll: 2 2 5 6 6. You decide to try and get all sixes, so you want to roll both twos and the five. Type: 225, then [RETURN]. You select which combination of dice you want to score by typing the appropriate letter that appears in front of that choice. If you had rolled 1 1 1 5 3, you might select aces, which is selected by typing [A]. Sometimes you have to select something that gives you a zero score. To guard against an accident, the Pet will ask you "Really zero it?" If you type YES, then it will accept your request. (You can avoid this by typing a [Z] in front of your choice).

SLOT... This is a simple program that is lots of fun. You should hook up your Pet for sound to get the full benefit. (Reminder: in any program that uses sound, if you use the stop key to interrupt the program while it is producing sound, you won't be able to save programs on cassette until you turn the Pet off, and then back on again).

FLIP... As you may know, Commodore has developed a new set of ROMs. One of the changes that they've made involves the way that upper and lower case is handled. With the old ROMs, when you POKE 59468,14 you are in upper and lower case mode, but the lower case letters are shifted (i.e. the opposite of a normal typewriter). With the new Pet ROMs, the opposite is true. The problem you may find is taking programs written for the old ROM convention and translating them for the new ROMs. Please note that there is not usually a simple solution, even with FLIP! To use FLIP, first read it into the Pet and RUN it, which stores it in the second cassette buffer. Then read in the program that you want to convert, and type SYS(826). Note that FLIP is reversible, so that after you flip a program, the next time you type SYS(826) it will be flipped back to its original condition.

The toughest problem that you'll find is that it will still take some work to convert a program to the new ROMs, because FLIP doesn't know whether a given part of the program is expecting graphics mode (POKE 59468,12) or upper and lower case mode. Ideally, flip would only operate on that text that is used with upper and lower case, but there isn't a practical way to do that. Instead, you'll need to experiment by flipping the program, running it and seeing which parts you don't want flipped. At this point you can flip it back, and use a trick: the flip program normally works only on PRINT, INPUT and DATA statements. So, for lines that you don't want flipped, just edit them so they start (temporarily) with the keyword REM. Now when you type SYS(826) and flip the case of the program, it will ignore those lines! One more thought: this program normally flips strings in quotes in DATA statements. If you want DATA left untouched, type: POKE 884,255 before you type SYS(826).

CIRCLE... We wanted to have as much data as possible in this program, yet still fit it into 8K. So, there are no directions within the program at all! However, it is an easy program to use, as you will see. There are two ways that you can use the program: you can tell it the country (or state) from which the trip begins, and it will search its built-in data bank for the information. For example, if you want to find the distance from Washington, D.C. to Los Angeles, California, when the program asks "From where:" you would type the first letter of the state [D]. It will then query you for each city that it knows about. Next, it will ask "To where:", and you repeat the procedure. The second way of using the program is to press [RETURN] when it asks "From where:". When you do this, it assumes that you want to enter latitude and longitude in degrees, minutes (and seconds if you like). Degrees, minutes and seconds are separated by commas. For latitudes you'll need to also enter [N] or [S] for North or South, and for longitudes naturally you'll need to put in East or West. The CIRCLE program was purchased from Martin Mabee who wrote the original version for the TRS-80 cassette magazine CLOAD. It was rewritten for the Pet by Glen Fisher. If your favorite country or city is missing, it is because we had to perform extensive surgery to make it fit into 8K. You can customize the program quite easily by adding or deleting data statements.

GAMMON... Sorry folks: if you have an 8K Pet, this program will not work for you, since it needs about 14k! We realize that many people have 8K Pets, but from our mail, it also seems that a lot of our readers have expanded their Pets to 16K. Since there are many things that have to be severely "stripped down" to fit in 8K, it seems reasonable that from time to time CURSOR should publish some larger programs. Actually, we'd like to get feedback from you on this matter. To make life easy for us, please send a postcard, and express your opinion about 8K vs. larger programs in CURSOR. Next month I'll report back to you with the results. (Please, no six page letters on this one. I'm already behind in answering the mail!)

GAMMON is a great version of Backgammon co-authored by David Malmberg and our software editor Glen Fisher. It has excellent instructions, so we won't have to say much here. I will mention that before I reviewed this game, I had only played one or two games of Backgammon a few years ago. However, I find the computer version to be really interesting and fun. If you don't already know the game, don't be afraid to try and learn, as it is one of the most interesting that I have found. If you are a novice, there is a strange Backgammon term you'll see: a "blot" is simply a single piece all by itself. The game is such that blots are not what you want to have on the board, as they are vulnerable to attack by your opponent.

A CURSORY GLANCE

My impression is that Commodore has very bright guys in their engineering department, and that they have designed a good system. However, I think that the problems of getting a product as complex as a floppy disk system fully ready for the consumer market have been seriously underestimated. Many of the best technical people at Commodore are quite young, and do not have the "seasoning" that comes from having your head bloodied by a product that was introduced too soon. Another major problem with the disk system is that the manual doesn't give enough information for either the new user or the experienced "hacker". I can only guess at what sort of tricks advanced users will be able to make the disk perform, as the manual is frustratingly devoid of technical details. All that I can report is that the little bit of information that is given about the 2040 disk utility commands such as BLOCK EXECUTE, MEMORY WRITE, and MEMORY EXECUTE are tantalizing clues about what may be under the covers. There is 4K bytes of memory out in that system, with a full blown 6502, as well as a substantial set of stuff in the disk ROM. Sounds like those pieces could be made to do some pretty fancy tricks when we get enough information.

Evidently I was not the only person that was unhappy with the way that the Commodore Disk Operating System treated the user. According to Commodore, a new function will soon be available called "The Wedge". (The names comes from the fact that it prints a wedge ">" as its prompt character). As I understand things, the wedge will be the first program on each diskette. When you bring the system up "cold", you will do the following: LOAD "*",8. (In the Notes for Cursor #9, I criticized the very awkward sequence of commands that are needed to look at the directory of a newly inserted disk. At that time I wasn't aware of this shorthand method.) The command "LOAD "*",8 goes to the disk and brings into memory the first program on the disk. (I wish that it brought in a program with a certain name, such as STARTUP...) So, if you have the new "Wedge" program as the fisrt thing on your disk, you will be able to load it into memory automatically. From what I know, the Wedge is a machine language program that will make many of the DOS commands available from the keyboard. Most importantly, it will allow you to look at the directory of a disk without destroying the program that is currently in memory.

My experience with the 2040 for a little over one month has been mixed. I'm not sure why, but my disk has not performed as it should. One of my disks works quite well (although not perfectly.) On that drive, I find that diskettes sometimes won't "initialize" correctly. However, once they start working, I have almost no trouble. But, if I take a disk from drive zero and put it in drive one, I don't have very good luck. The most common thing that happens is that I won't be able to read the disk at all on drive one. In my opinion, Commodore will probably solve these problems. I know that they are trying to decide what to do about the fact that the 2040 runs hot. I just hope that those of us with early units will get an upgrade once they find the problems.) The reason that I think that Commodore will solve the disk problems is very simple: if they do not succeed in making the 2040 work reliably, they will not be able to stay in the computer business. Since I assume that they plan to continue in the business, I also believe that they will solve their problems. (Incidentally, since CURSOR is sold only to Pet owners, I have a strong economic incentive to see Commodore do well.)

CURSOR 10 HAS THESE PROGRAMS: (Programs ending in '!' use CB2 sound.)	
COVER!	Another musical cover. Hook up your Pet for sound and enjoy!
TITRATE	Practice titration by turning your Pet into a chemistry lab. By Garry Flynn.
FINANCE	Calculate mortgages, pension plans, savings, etc. By T.M. Wagner
COURSE	An interesting obstacle course, with varying degrees of difficulty. By Glen Fisher.
ASM	A simple assembler for the 6502. By Glen Fisher.
READER	This program turns machine code into DATA statements. By Glen Fisher.

MORE ABOUT THE PROGRAMS

COVER... To appreciate this cover, you will need to have your Pet attached to a small amplifier. (Actually, a big amplifier is even nicer, but it doesn't matter very much.) CAP Electronics, 8462 Hillwood Ln. Tuscon, AZ 88715 sells a modified radio and a demonstration tape for about $30. You plug their edge connector into the back of your Pet, and you are all set for the style of sound that CURSOR and several other vendors use. (It is called "CB2 Sound", as that is the function of the 6522 that is used.) You can also use the Radio Shack 200mw Speaker/Amplifier, Catalog Number 277-1008. Channel Data, 4141 Hollisterv Ave Santa Barbara, CA 93111 sells the Radio Shack amplifier and the appropriate edge connector for about $20. If you want to do a little work yourself, you will need to get an edge connector, and solder two wires to the connections to pin 12 (ground), and pin M (sound). See Notes for CURSOR 3 for a diagram. However you do it, DO IT! If you have a Pet, and you don't have sound, you are missing one of life's little pleasures.

TITRATE... This is a beautiful example of how an educational excercise can also be a lot of fun. Garry Flynn wrote this simulation of the process of titration, which is a common procedure in chemical analysis. Remember, you are trying to get the solution to just turn color, which is shown as grey on the Pet. If you go too far, it will turn white, which means that you went past the end-point, and wasted the sample.

FINANCE... This is a program that will assist you in several routine calculations, such as compound interest, mortgage payments, pension plans, etc.
COURSE... You select the degree of dificulty that you want for the obstacle course that the program builds for you. After the course is displayed, use the number keys to move the cursor from the upper left corner to the lower right corner in the minimum amount of time. Hint: don't forget that you can move diagonally! The course is a bit tricky, but we assure you that there is always a path that will take you to the finish.

ASM... Please see the article that begins on Page 3 of these Notes. Our purpose in publishing this simple assembler is to make it possible for a large number of people to experiment with 6502 machine language by using an assembler. The CURSOR assembler has one design goal: get as much capability into as little memory as possible. There are far better assemblers around, but in one case, by the time you get the assembler into an 8K Pet, you have almost no room left for your code! Please don't think for a minute that we are suggesting that you should quit using Basic. But in some cases, you will want to experiment with the "guts" of your system, and to do that you'll have to face machine code. Also, there are times when the extra overhead of the Basic interpreter makes a function too slow to be useful.)

READER... After you have written and debugged your assembly language program, what next? You probably want to use Basic as the easiest way to load the code into the machine. So, first you assemble the code (quite likely into the second cassette buffer that starts at 826 decimal). Next, you load in the READER program, and run it, giving a starting and ending memory location. READER will print DATA statements on your screen, which you can then enter into the program by pressing [RETURN] on each line. If it won't all fit on one screen, just keep repeating the process until you get it all entered in. Then, you can delete the Reader program, and save your machine code as a Basic file. This all sounds harder than it is! But believe me, if you have ever tried doing the same thing the hard way by copying the stuff down by hand, you can appreciate what a nice utility this is.

"There's no sense being precise about something
when you don't even know what your are talking about."
                                        – John von Neumann

THE CURSOR ASSEMBLER

A prerequisite to using the assembler is a knowledge of 6502 machine language. We don't have room to go into it now, but there are a number of books available on the subject. At the least, you should have a copy of the MOS Technology 6502 Programming Manual.

Why an assembler? For that matter, what IS an assembler? As is our usual fashion, we shall answer the second question first. An assembler is a program that reads an assembler program and translates it to machine language.

(Before we take any more questions, let us clarify a confusing point: the word 'assembler' can refer to either the program to be translated or to the program doing the translating. This is unfortunate, but true. Henceforth, the program doing the translating will always be 'THE assembler' or 'AN assembler', while the program being translated will just be 'assembler'. We now return to the lecture already in progress.)

Assembler programs are machine-language programs written in a way that makes them halfway comprehensible to people. Real machine language is actually pure numbers, and is completely indecipherable except to the computer (and REALLY dedicated hackers). Assembler uses names for all those things for which numbers don't make sense to people. For example, the number $AD, to the 6502, means 'load a number into the accumulator'. To people, it means nothing at all. So the assembler lets people write 'LDA' (LoaD into Accumulator) instead, which is more easily remembered. (A note: anything, and ONLY those things, starting with a '$' are hexadecimal, or base-16, numbers.) Another advantage of using names instead of numbers is that programs written using names tend to have fewer errors in them than programs written using numbers only.

The 6502 computer has 56 different kinds of instructions, each coming in several styles. To match that variety, the assembler has 56 different names, one per instruction, with styles enough to match all of the 6502's. We won't waste space by listing all the instructions, but it is worthwhile to look at the styles they come in. The proper name for the styles that instructions come in is 'addressing modes'. The 6502 has thirteen different addressing modes. The addressing modes control just how and where each instruction gets hold of the number it's going to play with. Things aren't as bad as they sound: no instruction uses all thirteen modes; many use fewer than four, and a number of instructions are restricted to one mode only. Along with the list of modes, we'll tell how it is indicated in the MOS Technology assembler (as that is how many programs are published) and in our assembler (as that's how you'll have to write it).

Mode	Them		Us	
Implied	BRK		BRK	
Accumulator	LSR	A	LSRA	
Relative	BCS	NEMO	BCS	+NEMO
Immediate	LDA	#10	LDA#	#10
Absolute	JSR	QUIX	JSR	;QUIX
X-indexed absolute	STA	FOO,X	STAX	FOO
Y-indexed absolute	ADC	ABC,Y	ADCY	ABC
Page zero	BIT	ZPG	BIT.	.ZPG
X-indexed page zero	INC	SPOT,X	INC.X	SPOT
Y-indexed page zero	SBC	PLUGH,Y	SBC.Y	PLUGH
Indirect	JMP	(THERE)	JMP@	THERE
Pre-(X-)indexed indirect	AND	(MASK,X)	AND@X	MASK
Post-(Y-)indexed indirect	CMP	(NUM),Y	CMP@Y	NUM

As a bonus, we threw in a sampling of instructions. All those funny symbols under 'Us' will be explained later.

The 6502 can refer to up to 65536 different spots in which it can remember numbers. The exact number available depends on how much memory your Pet has in it, however. Each one of those spots in memory has a number (called its 'address') which it can be referred to by. For example, the first spot in the 2nd cassette buffer is spot number 826. Clearly, it is just as annoying to have to keep track of those numbers as it is to remember the numbers for instructions. The assembler provides things called 'labels' to aid you in that. Whenever you happen upon a spot you want to refer to later, you can tell the assembler the spot, and what name you're going to call it. After that, you use your name for the spot, and the assembler will plug in the proper number in place of the name. The sample program below has several labels in it, which ought to help clear things up.

How to use the assembler

In this assembler, as in many assemblers, there are three classes of things you can say to it: instructions, operands, and directives. Instructions are just the names of the 6502 instructions (with a little extra tacked on the end). Operands are the names of the places from which the instructions get the numbers they play with. Directives are commands to the assembler itself, which don't get translated to machine language. For example, the command to attach a name to an address is a directive.

The instructions can be any legal 6502 instructios. The addressing mode of the instruction is indicated by a suffix of one or two characters. The characters are as follows ('bl' means 'blank' (there is no suffix)):

bl absolute	X absolute,X	Y absolute,Y
. page zero	.X page zero,x	.Y page zero,Y
@ indirect	@X indirect,X	@Y indirect,y

bl implied	bl relative
# immediate	A accumulator

The assembler comes with a broad selection of operands as well:

One byte operands:

#10	decimal literal (means 'literally, a ten')
$F2	hexadecimal literal ($F2 equals 242 in decimal)
'X	character (ascii) literal (represents the ascii value of the character. Thus, the operand 'R is the same as the number 82. If the character is shifted or is ',' or ';', it should be in quotes.)
.PLINTH	a page zero address, or a named constant
+LOOP	a relative branch destination

Two byte operands

;FOONLY	absolute address, or a named constant
;#59468	decimal address or two-byte integer
;$FFD2	hexadecimal address or two-byte integer

The assembler also has two <u>directives</u>: '@' and '='.

@826   tells the assembler that anything assembled from the directive on down should be put in memory spots 826 on down. In other words, the assembler's 'location counter' is set to 826. The location counter keeps track of where the assembled code is going to be put. It is also used to provide a value for named constants, as will be explained below.

@$33A   does the same thing as the other @ directive, but takes a hexadecimal address, instead of decimal.

=HERE   tells the assembler that you are going to call the current memory spot 'HERE'. The assembler will save the current value of the location counter under the name 'HERE', and look it up again whenever you use 'HERE' somewhere else (like in a branch instruction).

The '=' directive is also used to give names to constants. Giving names to constants has the same value that giving names to everything else does: it makes things easier to remember. Suppose you're writing a text editor (a popular pastime among hackers). For some reason you've decided to use a '1' to mean move up one line, and a '2' to mean move down. Compare the two program fragments, and decide which is more understandable:

```
                              @1
                      =UP                 (1 means UP one line)
                              @2
                      =DOWN               (2 means DOWN a line)
          CMP#  #1            CMP#  .UP    (did he say UP?)
          BEQ   +GOUP         BEQ   +GOUP
          CMP#  #2            CMP#  .DOWN  (how about DOWN?)
          BEQ   +GODOWN       BEQ   +GODOWN
```

Most people will prefer the stuff to the right, since it is more apparent what the intention of the code is. (The comments apply to either side.)

The assembler code should be typed into the assembler as DATA statements, starting at line 11000. Separate the instructions, operands, and directives from each other with commas. (You could enter them one per line, but that gets rather wasteful of space.) After you've typed in all your program, <u>save it</u> (along with the assembler). It would be a shame to have to retype all that code. After the save is finished, run the assembler. It will print a listing on the screen as it assembles the program. (It does no good to route the listing to a printer; the cursor control keys are used in it, and they don't print very well. The result would be a goodly amount of scratch paper.) The assembler reads your program twice: first to find out what all the labels are, and again to produce the machine code. While your program is being read the first time, the assembler will print the labels as it finds them, to let you know what it's doing. When your program is read the second time, the main listing is done. The listing shows all of your program, and what values are put into what memory locations. Below is a part of the listing from the program that comes with the assembler:

836	162	LDX#	
837	0		#0
838		=OUTER	
838	160	LDY#	
839	0		#0
840		=INNER	
840	177	LDA@Y	
841	1		.PTR
842	201	CMP#	
843	32		'
844	240	BEQ	
845	4		+SKIP

The numbers with a box around them represent reverse-video (the thing we do these notes on can't
print that way). The number to the left is the value of the location counter, and tells where the
number to its right was put. The second number is the number produced by the assembler in place
of the instruction or operand to the far right. If the location counter is reverse-video (black
on white) then nothing was produced by the assembler for that line; it only made a note for itself
about the line. Last, the instruction, operand, or directive is listed. Its position on the line
is adjusted in an effort to keep the listing somewhat readable, and is similar to the listing of
the program below. When the assembler is done, it will say 'ASSEMBLY COMPLETE', and stop. If
there were any errors, a message will have been printed beside the line in error, telling what the
error was. (If you get 'BYTE TOO BIG' on a branch instruction, the label you're branching to is
more than 128 bytes away, and can't be reached from the branch. If you get 'TOO MANY LABELS',
increase the value of SIZ on line 100.)

When at last the assembler gives no error messages, you are ready to test it. Before you do, SAVE
THE ASSEMBLER AND THE PROGRAM YOU WROTE! Assembler programs have a nasty habit of making the Pet
go off into limbo, where you must turn the Pet off and on again to bring it back. If that
happens, and you didn't save your program, you'll have to type it in all over again. To run the
program, use the SYS command to make the Pet start running the machine language program. If your
program starts at location 826, type

              SYS 826

If you're lucky, your program will run the first time. If not, you'll have to debug it.
Debugging programs is a whole subject unto itself, and will have to wait for another time. One
suggestion, however: use the machine-language monitor. It isn't perfect, but is a help in finding
where the program goes wrong, especially with the new Pets, when it stays around all the time.

The assembler as it appears in Cursor comes with the following program built in. The program
looks at the Pet's screen and changes all non-blanks to reverse video (or back, if they were
already reversed). We list it here side-by-side with the same thing written using MOS Technology
style, both so you can see how programs are written using the assembler, and for further help in
reading MOS Technology style programs.

```
         MOS Technology          Us
                                 @32768
                                                    (note where the screen buffer is)
 CRT   EQU  32768        =CRT
                                 @1
 PTR   EQU  1            =PTR                        (handy spot on page zero)
                                 @$80                (named constant here)
 BIT7  EQU  $80          =BIT7                       (high-order bit of a byte)
       ORG  826                  826                 (put code into the 2nd cassette buffer)
       LDA  CRTADR              LDA   ;CRTADR        (set PTR to start of CRT buffer)
       STA  PTR                 STA.  .PTR
       LDA  CRTADR+1            LDA   ;CRTADR+1
       STA  PTR+1               STA.  .PTR+1
       LDX  #0                  LDX#  #0             (X counts quarter-screens)
 OUTER LDY  #0         =OUTER   LDY#  #0             (Y counts characters)
 INNER LDA  (PTR),Y    =INNER   LDA@Y .PTR           (get a char from the screen)
       CMP  #'                  CMP#  '              (is it a blank?)
       BEQ  SKIP                BEQ   +SKIP          (if so, leave it alone.)
       EOR  #BIT7               EOR#  .BIT7          (otherwise, reverse it)
       STA  (PTR),Y             STA@Y .PTR           (and put it back)
 SKIP  INY            =SKIP     INY                  (on to next char)
       CPY  #250                CPY#  #250           (end of quarter-screen?)
       BNE  INNER               BNE   +INNER         (no - so flip next char)
       CLC                      CLC                  (yes - advance to next quarter-screen)
       LDA  PTR                 LDA.  .PTR           (by adding 250 to start pointer)
       ADC  #250                ADC#  #250
       STA  PTR                 STA.  .PTR
       LDA  PTR+1               LDA.  .PTR+1
       ADC  #0                  ADC#  #0             (add carry to high byte)
       STA  PTR+1               STA.  .PTR+1
       INX                      INX
       CPX  #4                  CPX#  #4             (finished last quarter?)
       BNE  OUTER               BNE   +OUTER         (if not, do next quarter-screen)
       RTS                      RTS                  (all done - go away)
 CRTADR DW  CRT         =CRTADR ;CRT
```

You can try out the program by running the assembler after it has loaded. The assembler will
print a listing, as described above, and stop when it's finished. (If you get an error, you must
have had a load error, as we carefully exterminated all the bugs before we let it loose.) After
the assembler is done, type 'SYS 826', and watch what happens. You can re-run the program as many
times as you like.

The observant among you will have noticed that the program doesn't do the whole screen at once; it
carves it up into quarters, and does one quarter at a time. The reason is that the 6502 does all
its work in byte-sized chunks (no humor intended - honest!). The largest number that one byte can
hold is 255. Unfortunately, the screen is 1000 characters long, which is clearly more than 255.
After some deep and abstruse calculations, we find that one-quarter of the screen is 250
characters long, and 250 WILL fit in one byte. Taking advantage of that, the program has a small
inner loop to reverse one quarter of the screen, and an outer loop to count how many
quarter-screens have been reversed. As you can see, programming in Basic does have its
advantages.

WHERE TO LEARN 6502 ASSEMBLER

There are several books on the market intended to teach 6502 machine language, of varying quality. The better ones are rather biased towards the KIM, and away from the Pet, and so are of limited usefulness. The books we have been able to see ourselves are:

Programming a Microcomputer: 6502 by Caxton C. Foster - covers the subject fairly well, with many different applications. However, those applications are mostly for the KIM. As a source of information, rather than programs, it could be useful.

Programming the 6502 by Rodney Zaks - a rather thick book, 305 pages. That isn't as much as you might think, as a quarter of the book is given over to a compendium of descriptions of the instructions. On the whole, you would do better with something else (the MOS Technology manual covers most of what's in here all by itself.)

The First Book of KIM by Butterfield, Ockers, and Rehnke - almost useless for the Pet, as it is chock-full of many fascinating goodies for the KIM. Nearly all of those goodies will work only on the KIM, however, and not the Pet, as the Pet and the KIM have different built-in software.

The MOS Technology Programming Manual for the 6502 - While not the best, it is useful for the Pet, as it makes very few assumptions about how you are running your programs, or where. Also, since it is put out by MOS Technology, which makes the 6502, it can be considered to be the final source of information, to which all others much conform. (Since they make it, they BETTER know how it works!)

There are other books on 6502 machine language available. The ones mentioned above are just the ones we have seen. If we sound somewhat harsh on them, it's that we have as high standards for books as for programs. By the time you read this, Adam Osborne's 6502 book should be out. We haven't seen it, but he has an excellent reputation in such matters. It is called 6502 Assembly Language Programming by Lance A. Leventhal, and can be bought from your friendly local computer store. If you don't have a friendly local computer store, or are harboring a grudge against it, you can write to:

> Osborne McGraw Hill Associates
> 630 Bancroft Way
> Berkeley, California 94710

Those of you acquainted with other 6502 assemblers will have noticed that the CURSOR assembler requires that the programmer type more than the usual 6502 assembler. The reason for that is to keep the assembler small, so that larger programs may be assembled. Since the assembler can know exactly what code to put out without having to know about other parts of the program, it is simpler, and therefore smaller. For example, it can produce the proper number for a specific instruction without having to decide what kind of operand is being dealt with. Similarly, it can handle the operand correctly without having to remember which instruction the operand went with. The extra typing is an inconvenience, true. Having used it as our production assembler for a while, we have found that the inconvenience isn't as much as would be thought at first. Also, since your program is part of the assembler (which is in Basic), you have the full power of the Pet's screen editor available to correct your mistakes.

ABOUT PROGRAMS LARGER THAN 8K

The mail is running about even on the issue of CURSOR publishing 16K programs (such as GAMMON in CURSOR #9). Since some people feel strongly that we should NOT publish large programs, we are going to proceed very carefully. One possibility will be that when we want to publish a 16K program, that we will include it as a sixth program on the tape, so that our loyal 8K subscribers don't feel cheated.

A CURSORY GLANCE

During mid-June I visited the Commodore plant and had an enjoyable and interesting afternoon. As you might guess, the 2040 disk system was discussed during my visit. Commodore is aware that they need to make the 2040 easier to use. In the near future, this will be done with the "wedge" program that I mentioned last month. I have been able to use the "wedge" for a while now, and find that it does make life with the 2040 much more pleasant.

Although the wedge helps a lot, but does not represent the ultimate answer. The version that I have tested does not know the difference betweeen command mode and data input via a GET statement. As you might guess, this can lead to exciting results when you type a "/" as part of input data! (The wedge sees the character, and tries to go off and load a file). I expect that they will be able to correct that problem before the wedge is released. In the long run, I think that Commodore will develop a more sophisticated user interface with the 2040 disk system.

As far as the reliability of the 2040 is concerned, the jury is still out. I now have a 2040 that works very well! However, I also personally know of several disk systems that have been returned to the factory for adjustments or repair. I think that two things are involved with the reliability issue. First, a disk system is more complex to make than a computer is, especially a smart disk like the 2040. The production people and the Quality Assurance folks at Commodore are probably doing everything that they can to alleviate the problems as they become known. But it takes time to work everything out, and it takes experience.

As with many new products, the disk also has some design glitches. It is quite normal for design changes to take place as field experience with a product is accumulated. It is not always simple to decide how to resolve some of these problems. Take the heat situation with the 2040. (Every 2040 I have seen runs very warm.) There are folks at Commodore that think I have made a big issue out of something that isn't a demonstrated problem. I'll admit, it is hard to "prove" that the temperature that the 2040 runs at causes any of the problems we have seen. But somehow I feel nervous when I take diskettes out of drive one and they are very, very warm to the touch.) However, it isn't easy for the engineers to decide how to get the unit to run cooler. The obvious answer of installing a fan can produce problems that might be worse than the heat! Dust is a real problem with floppy media. A fan that doesn't circulate filtered air may cause problems by moving the dust around, and getting a bunch of junk on the media that wouldn't have gotten there otherwise. Also, the fan will increase the cost of the unit, as well as give you another electro-mechanical component to fail. So, they are also looking at "passive" (i.e. non-fan) solutions, such as better venting and decreasing the amount of heat that is generated.

I came away with a strong impression is that Commodore has a number of very bright, talented technical people. (Chuck Peddle is the best known, and he deserves a great deal of credit for having the vision, way before most others, that a single board computer could be packaged as an appliance.) But there are many other technical folks at Commodore, both hardware and software who also deserve a lot of praise.

CURSOR 11 HAS THESE PROGRAMS: (Programs that end with "!" use CB2 sound)

COVER	A fireworks display. By Glen Fisher.
DEMON!	Can you capture the Demon? (Has great sound effects). By Ken Morley.
HI CALC	A high precision calculator. By Glen Fisher.
WIPEOUT	Roll the dice and try to eliminate the 12 numbers. By Sheila Dolgowich.
PEG	A clever pegboard game. By Julia Hallford.
STATES	Learn the states and capitals of the United States. By Art Carpet.

MORE ABOUT THE PROGRAMS

DEMON!... A delightful piece of entertainment where a little demon pops up at random, and your task is to catch the beast. This game uses joysticks for input, if you have them, otherwise you can use the numeric pad. Hint to non-joystick users of DEMON!: you can improve your performance by using both hands. Try putting two fingers of your right hand on the [8] and [6] keys, and two fingers of the left hand on [4] and [2]. Also, note that by holding the key down, you continue going the direction that you are pointed.

HI CALC... This is a high-precision four-function calculator. On an 8k Pet with the old ROMs, it can do arithmetic using at least 120 significant digits, while on a new Pet with 16k it will work on about 684 digits! The exact number of digits carried depend both on what roms you have and how much memory. This is due to the array subscripting bug with the old roms. This means that regardless of how much memory you have on an old rom Pet, the most precision you can expect from HI CALC is about 381 digits, while with the new roms, the only limitation is how much memory you have, although we limit it to 684 digits. The methods used are the same ones as for paper and pencil calculations, modified somewhat to make them suitable for use on the Pet. For details, see Donald Knuth's _Art of Computer Programming, Volume 2: Seminumerical Algorithms_, pages 229-245. There are added complications in HI CALC due to the need of handling fractions (mostly trying to keep track of the decimal point). The program actually does all of its work in base 1000. This is because less memory is used by storing the numbers that way, and also because it makes it easy to correctly place commas.

The important variables in HI CALC are:

A%	The accumulator where results go.
E%	The entry where typed numbers are kept.
AS,ES	The sign of A% and E%.
AI,EI	The number of "thousits" to the left of the decimal point. (I for integer).
AF,EF	The number of "thousits" to the right of the decimal point. (F for fraction).
AL,EL	The number of significant "thousits" in A% and E%. (L for length). PRThe precision, in "thousits". Equals number of decimal digits divided by three.
PL	The number of places kept after the decimal point, also in thousits.

Numbers are kept in A% and E% with the rightmost "thousit" in A%(1) and E%(1), and the leftmost in A%(L) and E%(L). The combination of AI and AF keeps track of the decimal position in A%, and likewise EI and EF perform the same function for the E% array.

Whenever a number is created (or typed) that has too many significant digits, HI CALC will print the message "ROUNDING!". The answer you get back will still be displayed as the correct magnitude, but some of the less significant digits will be zeros. When HI CALC starts up, it is set to carry 15 or fewer decimal places on a divide operation. This protects you from waiting for 684 3's when you divide 1 by 3. You can change this limit by typing a decimal point when HI CALC asks for an operation. You'll then be asked "What precision?', and you response will be used when dividing. If the number of places to be kept is larger than the precision, the program will calculate as many as it can store, and then round the result. Note that due to the fact that numbers are stored in base thousand that HI CALC will only use a number of decimal places that is a multiple of three.

How, you ask, did we go about checking the results? We did two things: we tried a lot of problems that a hand calculator could handle as a way of showing that the algorithms worked, at least with small numbers. We also tried some very large problems on another computer that has a different high-precision calculator, and found that we checked out exactly!

WIPEOUT... A fun dice game that takes some thinking, as well as a fair amount of luck. You roll two dice, and then remove as many of the 12 numbers as you can. When you roll doubles, you get an extra roll, which comes in handy when you are unable to remove any numbers on a given roll of the dice.

PEG... A classic game where you try to interchange two sets of pegs on a board. It can be done, so if you tire of trying, give zero as your move, then ask the Pet to solve the problem.

STATES... If you've always wanted to learn all of the capitals of the U.S., here is a wonderful educational excercise for you.

A CURSORY GLANCE

It is always fun to speculate, so this month let's share some thoughts on what may happen over the next 12 to 18 months in the personal computing area. As the summer of 79 is ending, there are still only three mass market personal computers: Radio Shack, Apple, and the Commodore CBM (nee PET). (For those who haven't been tuned in, you may not have noticed that the wizards at 3330 Scott Blvd. have decided that the connotations of the product name "PET" were somehow not serious enough. Therefore, the printers, for example, are known as CBM this or that. Ah, but the plot thickens: Commodore Business Machines didn't have that ring of seriousness either, and somehow reminded folks of calculators or whatever. So, there will be (or is) a new entity called Commodore Business Systems.

There are several new products on the near horizon that will affect the personal computing market quite a bit. Atari will release its new home computers in September on the West Coast. The Atari is a nice, solid little machine that has had the benefit of being designed after the early attempts of the current "big three". The human engineering of this product is exceptional, and the people who are guiding its development seem to think that they should provide strong support in the form of well written manuals with the very first machines that come off the production lines. (The days where companies can continue to sell machines that have sketchy "preliminary" user manuals is fast drawing to a close. People don't want to solder their computers themselves anymore, and they simply will quit buying computers that have inadequate documentation.) As you have heard, the sleeping giant Texas Instruments has finally brought out their first little computer. Frankly, the machine is something of a puzzle, since it has a rather strange mix of features. For example, it has 16K of user memory (RAM), which is a nice amount for a beginning machine. However, there is no way that you can add more memory! TI has decided that you don't need upper and lower case, and will tolerate a strange calculator style keyboard. Then there is the toy company Mattel, which has a clever idea: sell them something they can use for about $250, then later you can get them to spend another $250-$300 to add a keyboard and tape deck so that the machine can be used for something useful.

Another new product that can't be ignored is the reborn Radio Shack, known as the Model II. It is clearly a business machine, not a home computer. It comes with 8 inch floppy disk drives that hold about 500,000 characters each, and will speak languages other than Basic. The Model II will be a tough product for Commodore to compete with, at least with the current CBM/PET machines. There are three main reasons to buy and use a computer: for use in your business, (general ledger, accounts receivable and payable, payroll, inventory, word processing), for use in an educational environment, (teaching programming, computer literacy), and as a personal computer (games, word processing, technological toy). The Radio Shack Model II is clearly aimed at the business applications, and will also be used in some educational settings, but is not a personal computer as we know personal computers today. The old Radio Shack Model I was a hastily designed machine that happened to be promoted right, and that was given very good support by Tandy. The first generation of the Commodore computers were an interesting lot: clearly designed with more finesse than Radio Shack (although in several ways not as nice as the Apple), and trying to be all things to all people. For many serious business applications, the current Commodore disk system will be inadequate due to the relatively small amount of storage on each disk (170,000 characters). (Apple has the same problem, only worse, as they get even less storage on the 5-inch diskettes.) As I have said before, the disk operating system that Commodore is currently using has design problems that will limit its usefulness in some end-user applications. The unconventional way that they chose to do random access is one example, and one that it will take a redesigned DOS to correct.

During the coming year, I think that we will see at least one new computer from Commodore, so that they can remain competitive with the many new products from other companies that will appear during the year. I would imagine that one possible machine will look similiar to the current large keyboard Pet, but have either one or two 5-inch disks built-in, probably under the CRT screen. I would expect a different disk operating system (easier to use than the 2040 system) will be designed as part of the new machine. I wouldn't be suprised if the new product has an 80 character wide screen, rather than 40. Color? I don't think so. Commodore is going to leave that part of the market to Atari and others. In the somewhat longer term (18 to 24 months), I think we can look forward to large disk systems that talk to several Pets. Nestar may be able to do this sooner than Commodore, but somebody will do it.

CURSOR 12 HAS THESE PROGRAMS: (Programs with that end with '!' use CB2 sound.)	
COVER12	A symetrical graphic design by Glen Fisher.
CANYON	Train to become a starship pilot, using either joysticks or the numeric pad to control your ships. By Larry Stevens.
GAUSS!	Watch (and listen) as the Pet drops 1000 balls an hour into one of 12 bins. By Glen Fisher.
PICKUP	Your mission: gather all of the dangerous chemicals. A game of great skill and daring. By Larry Phillips.
PIEGRAM	You and the Pet throw pies at one another. Idea by Sheila Dolgowich.
FLIGHT!	Watch as Canadian astronauts land on the moon. By Ken Morley.

MORE ABOUT THE PROGRAMS

If you are using an 8K Pet with the 2040 disk, please do **not** use the DOS Support "Wedge" program with Cursor programs, as we can't afford to lose almost 300 bytes of memory. NOTE: Program names that end with an exclamation point "!" use the Pet's CB2 sound. See CURSOR #3 for a diagram of how to hook up your Pet with sound. Be careful about using the STOP key with programs that use sound. Should you accidentally do so, you can stop the sound by typing "POKE 59467,0".

COVER12... You will see some pretty designs displayed on the screen. Notice that they are always symmetrical, and have either two or four "points". The designs are generated randomly, yet rules are applied that produce order.

CANYON!... CURSOR will not be responsible if you wear out your Pet by playing this game for hour after hour. You are the pilot of a starship, and try to navigate down a twisting (and gradually narrowing) canyon. You can use joysticks for the Pet available from Creative Software or Coyote Electronics with this game. Naturally, you can also use the numeric pad as a controller [4]=left, [6]=right. Yes, there is sound when you crash. Han Solo would be proud!

GAUSS!... This demonstration of probability principles is also a lot of fun to watch (and listen). Note: a Pet without sound is like a day without sunshine. Gauss! displays a constantly changing bar graph that shows the results of a ball bearing that is dropped through 11 rows of pegs, with a probability of 0.5 at each peg. If you want to do some interesting reading that relates to this program, consult any introductory statistics or probability text. Topics to read about include the binomial formula, Pascal's arithmetic triangle (which others wrote about much earlier), and the normal probability curve. (Especially recommended is "The Nature and Growth of Modern Mathematics", by Edna E. Kramer, Hawthorn Books, 1970, pages 313, 314 and 327-330.)

PICKUP... The premise of this game is simple: you are faced with a terrible laboratory accident, where four different chemicals have been dropped on the floor. You have a special tool (a scoop) that you control with either the numeric pad or joysticks. You try to pick up the chemicals, and deposit them in the proper corner. There are some clever twists: you are rewarded for working efficiently by a scoring rule that greatly increases your score when you pick up lots of a chemical in one "run". Likewise, if you deposit the chemicals at the wrong corner, you lose twice as much as you were carrying. When the game begins, your scoop is on the top row, and is shown as the white cursor. Once you begin moving, it continues moving. Learning to control the scoop is a frustrating (but rewarding) experience. Strangely enough, the numeric keypad is an easier way to play this game than the joysticks, due to more precise control. When you get really good, try the one minute speed=nine "blitz" game. Since there are twenty-five of each chemical, you will maximize your score by picking up all 25 of one chemical in one run, and repeating this for the remaining chemicals. For those of you that are already ZAP fanatics (see Cursor #2), I can only say "Here goes a few hundred more hours of your life".

PIEGRAM... You throw pies at the (hidden) Pet, trying to find where it is. Likewise, it throws pies at you, and uses triangulation to determine where you are. Ah, but at any turn, you (and the Pet) have the option of moving one square, or throwing a pie anywhere. The results of three most recent throws by each side are displayed, along with distance to the opponent at each throw. Shots earlier than the most recent three are just shown on the board as an asterisk "*". After the Pet has thrown three pies, it will calculate how likely it is that you are in each square of the board. While this is happening, a question mark will be shown in the square that it is think about. (No, it doesn't cheat!)

FLIGHT!... (You'll need sound for this one, too.) A nice little landing simulation, with an unAmerican (or is that non-American) crew.

PRACTICAL PROGRAMS

We get mail from subscribers asking for more practical programs. We hear you, and are currently planning several programs that will be useful to you. However, we would very much like to get your ideas on what type of programs you would use yourself. Sometimes it is a little difficult to admit that there is a large class of things that is more easily done with 3 by 5 inch cards, or a notebook or a chalkboard than with a small computer. For those of you with only 8K of memory, please realize that it is really hard to get a meaningful, practical program into 8K. Probably one of the better investments is an 8K Skyles memory board (mine has been as solid as a rock). An extra 8K makes a hell of a lot of difference in what you can do, especially where there is a fair amount of data involved. Again, we need your ideas about practical programs.

NOTES FOR CURSOR 13
August-September 1979
Ron Jeffries, Publisher
Glen Fisher, Editor

CURSOR ™
Programs for PET™ Computers

"Truth is never pure and rarely simple."
– Oscar Wilde

THE CODE WORKS
Box 550
Goleta, CA 93116
805-683-1585

A CURSORY GLANCE

The computer revolution goes on – and you are part of it. "Revolution" is a pretty strong word, but I think it is well chosen. Let me share an example or two with you: I have the pleasure of reviewing a lot of programs submitted by CURSOR subscribers. The submitted material runs the full gamut from absolute trash to very well written programs. What excites me is that some of our best submissions come from folks who didn't know how to spell computer a few weeks or months ago. We get letters such as "...this is the second program I've ever written...", and sometimes find a fresh and well thought-out program idea. On the other hand, some of our fellow professionals in the ranks of the computing "priesthood" also submit programs. Some are good, some are not worth the trouble of loading into the Pet.

Make no mistake: I'm not claiming that each and every Joe and Sally Six-Pak are potential Kernighans or Knuths. Nor do I propose that a Pet in every garage will turn billions of novice programmers into accomplished computer scientists. But there are far more people that are able to take these "dinky machines" and do creative, useful and fun things with them than most of us ever imagined.

So what? For one thing, over the next few years, small computers will become much more important than they are now. Sure, Radio Shack has sold maybe 200,000 TRS-80 units, and industry sources think that Apple and Commodore have each sold about 50,000 computers. Plus, the long awaited Atari is finally available at Sears, J. C. Penny and Wards (but only on the West Coast right now). Sears plans to sell 100,000 Ataris in the first year, and we might expect half that many to be sold by Wards and Penny's combined. Then again, the TI personal computer will soon be on the shelf, and though it is rather strange in many ways, it can't be discounted either. If you have not "experienced" a TI Speak 'n Spell get to your nearest dealer and do so right away. TI appears to have an important lead in producing speech inexpensivly. Their personal computer will have an optional voice output device.

If you subscribe to CURSOR, you obviously either own a Pet or have access to one. But what about the school that your children attend? With the computer revolution that is now taking place, it verges on criminal neglect to not have at least one personal computer in every elementary school classroom. "Computer literacy" must be a required part of the curriculum in each and every elementary, junior high and high school. What can you do? Talk to your principal, and to your child's teachers. Take a Pet to school and show them your favorite CURSOR programs. Let them know that you care what kind of learning opportunities they are providing in the area of computing.

Another thing you can do is to share your computer with some kids that don't have one in their home. Consider giving a short course for your local Girl's Club, Boy's Club or other youth organization. Sure, you may not be an "expert", but you can share what you do know, and be pleasantly surprised at how quickly the kids will be teaching you things about your Pet.

THE CODE WORKS (tm)

As CURSOR enters its second year of publication, we are planning several new products. For one thing, we are adding a tutorial service for the Atari called "IRIDIS". We are also working on some exciting software for the Pet (in addition to CURSOR). We have a new name – "The Code Works(tm)" – but CURSOR will remain the same: the best software value available for the Pet.

CURSOR 13 HAS THESE PROGRAMS: (Programs ending with '!' use CB2 sound)

COVER13	Chuck Bond (of Programmer's Toolkit fame) created this display of two fish swimming.
RATRUN	You are a rat in a maze (shown in perspective), and are trying to find the cheese. By C. T. Nadovich.
CARS	A program that will assist you in maintaining cost records for one or more cars. By John Grove.
FERRY	Try to ferry supplies across the asteroid belt. Has great sound effects. By Dr. John J. Matarella.
LEAP	A challenging logic game: try to remove all but one peg. Idea by Sheila Dolgowich.
TCARD	A convienient tool for wading through mounds of time cards. Idea by Herb Sandy.

MORE ABOUT THE PROGRAMS

RATRUN... You are a rat in a maze, and are being tested on how intelligent you are about finding a piece of cheese. The maze is shown in perspective, just like it would look to the rat. There are five commands: press [8] to move ahead in whatever direction you are facing. Press [4] to turn left, or [6] to turn right. If you press [2] you will turn around 180 degrees. Note that only [8] actually moves you, ([4], [6] and [2] only turn you in place). Finally, if you want to see where you have been, and have another maze generated, you can press the question mark?. As an aside, this program was submitted as two programs, each close to 8K long. Glen Fisher performed open heart surgery, and made it all fit in 8K, with a few bytes left over. One result is that the program has only sketchy directions. We will warn you that RATRUN is one of those programs that consume several hours of your time, and that some people are so fascinated by the program that it is hard to pry them away from the PET.

CARS...This is a cost accounting system which accumulates cash expenditures and pro-rates fixed, long-term expenditures to determine the actual cost of operation on a periodic basis. You can carry accumulated year-to-date figures from one month to the next on cassette tape if you wish. (Naturally, the tape data files will work on both the old and new Pets). The program maintains information on up to three vehicles. If you have more than 8K, you can change the variable "T" in the program.

CARS is an example of a program that could have been much nicer if it was written for a 16k system. For example, there is not the level of checking of valid input values that we normally like, and the prompts are a bit terse in several places. In fact, it took a great deal of work to make CARS work in a useful fashion in 8K. The first question asked by CARS is whether the previous month's data is on tape. Of course the answer will be "no" the first time you use the system. The next question asks whether you want to add or change vehicle names, or the fixed expense data for each vehicle. The first time through, you will want to put new names into the system, so select option 1. It will display three lines, and ask you what you want to do. For example, you might press [1], then press [RETURN], and then type the name of the car. (For ease of use, use short names for your vehicles. When asked for the names later on, you must spell them exactly as entered.) When you have added all the cars that you want in the system, press [RETURN]. You will be asked if everything is OK. If you need to change anything, enter the index number that is beside the item.

When you add or correct the fixed expense data, you must have first defined a valid vehicle name, (since the fixed expenses are associated with a specific car). First, the existing data will be displayed. You may keep it "as is" by hitting [RETURN] or change it by entering the new value, and then [RETURN]. The fixed expense items are: 1) INSURANCE: actual insurance cost for one year. 2)LEASED OR OWNED: enter the yearly lease charge (which includes depreciation and finance charges). 3) VALUE: enter the estimated current value for each car you own. 3) DEPRECIATION: the percentage that you expect the car to depreciate in one year. New cars, for example, depreciate at 20 to 30 percent the first year. Ouch! (If you have a clasic car that is appreciating, enter a negative depreciation. 5) FINANCE CHGS: if you are still paying for the car, enter the part of your payment that represents interest of finance charges. 6) LICENSE/CLUBS: enter yearly auto club, license and other fees.

Next, you will choose the units that data will be entered (such as miles and gallons), as well as the output units. Finally, you need to enter your monthly expenses for Fuel, Oil, and Miscellaneous. The first question you are asked is whether the begining milage is already in memory. If you keep data on tape, it will be, otherwise it won't. Note that when you enter fuel data, the ending point for the month should be the last time you filled the tank, NOT the last day of the month. After you have entered all the fuel data, press [RETURN]. You'll have a chance to correct any data item by entering its "index number". A limitation of the program is that it will only handle 30 entries per car.

Now we are ready to see the results as a summary on the screen. (Sorry, there was not room for a printer routine.) After looking over the reports, you are ready to save the data on tape if you wish. We strongly suggest that you alternate between two tapes, so that if something goes bonkers with your machine, you won't lose more than one month's data. (Always, ALWAYS "back-up" important data. Computers (and sometimes people) do fail! One last comment: you'll need to keep a notebook in your car and record the mileage, number of gallons and cost of each purchase of gasoline. Also, charges such as oil, repairs etc. should be recorded. Once you get in the habit, it isn't hard. (But when you find out what it really costs to operate your car you may cringe...)

FERRY!... You control five "drone" space ships by pressing [6] to go forward or [4] to go back (left). Hope you have CB2 sound!!!

LEAP...A great puzzle: you try to jump pegs, and clear the board of all but one. (Current world record: 2 pegs left in 4minutes and 28 seconds. Enjoy.

TCARD...If you have experienced the drudgery of wading through a stack of time cards, you'll appreciate this practical program. If you are writing your own programs, you might want to study how we've handle the problem of entering time values in an easy yet fool-proof way.

A CURSORY GLANCE

We can say goodbye to an old friend: the 8K calculator keyboard Pet is being discontinued. Taking its place will be the Pet 8N, an 8K Pet with the new full-size keyboard, new ROMs, and a price tag of $795. (Actually $895, because the cassette is no longer built into the computer.) The Pet will soon have a plastic case. There are conflicting rumors: one is that only the 8K model will be plastic, the other that plastic will be used on all models. Early models will be hybrid, with metal for the CRT display, and plastic for the main case. I'm told that Commodore will save about $20 per unit due to the use of plastic rather than metal. The computer will also be lighter, and easier to carry around.

Guess what is happening to your ROM slots? Conflict, that's what! The excellent Programmer's Toolkit from Palo Alto ICs uses one of the "extra" ROM slots. (On the new Pet, there are three in addition to Basic.) Well, a funny thing happened on the way to the Toolkit. Seems that the Palo Alto IC people talked to folks at Commodore, and were assured that there were no immediate plans for location $B000. So, that is where the Toolkit lives. Enter the Commodore Word Processing System: it also needs a ROM. You guessed it: that ROM just happens to be addressed at $B000! Why? Well, it seems that Commodore "has plans" for both of the other ROM slots.

This sort of thing was bound to happen someday. A reasonable solution would be a standard way for ROMs to coexist at the same memory address. (Naturally, you shouldn't expect to use both sets of ROMs at the same time.) It's too bad that Commodore didn't design this capability into the new Pet, but they didn't. Two companies have announced products to solve the ROM conflict problem: Skyles Electric Works will have add-on boards available by late November, and Small System Services, Inc. is offering the "Spacemaker". They are also coming out with a "ROMDRIVER", which allows switching ROMs under software control.

INFORMATION SOURCES

The Computing Teacher is published by the Oregon Council for Computer Education, Department of Computer Science, University of Oregon, Eugene, Oregon 97403. It costs $8.00 for six issues, which recently have been about 60 pages each. The content is a bit uneven, and the magazine is certainly not what you would call "glossy". However, there are interesting articles by people who are using computers in the classroom.

6502 Assembly Language Programming by Lance Leventhal is now available. If you want to learn 6502 machine language programming, this book is the one that I would recommend. The book explains each 6502 instruction with diagrams that show what happens to each register, as well as data and program memory. Most people will find Chapter 4 ("Simple Programs") to be a good way to learn about the 6502. Each example includes a statement of the problem to be solved, an assembly language source program, and then the actual object code produced by the assembler. To buy this 550 page, $9.50 paperback, see your local dealer or write: Osborne McGraw-Hill, 630 Bancroft Way, Berkeley, California 94710.

The Pet Gazette (made famous by Len Lindsey) has been born again as a slick new magazine called COMPUTE. The first issue is out, and the magazine has potential. COMPUTE is aimed at 6502 based systems, including Pet, Atari, Apple, OSI, Kim, Aim, and Sym. There are special sections called "Gazettes" which have information specific to certain machires, such as the Pet. The subscription price is a reasonable $9.00 for six issues. See your dealer, or write: Box 5119, Greensboro, NC 27403. All Pet owners owe Len a big "Thank You" for his work in putting out the original Pet Gazette. We wish him well in his new role as Senior Contributing Editor of Compute.

CURSOR 14 HAS THESE PROGRAMS:

COVER14   Chuck Cares developed this clever optical illusion. Watch carefully...

MATCH   How is your memory? Try and find the 32 pairs of symbols hidden on an 8 by 8 grid. (You'll have to concentrate!) By Julia Hallford.

SEARCH   Generate excellent word search puzzles. Uses the Pet printer. By Hal Carey.

BAT!   You are a bat that must eat insects to remain alive. Gravity and inertia make your task quite difficult, to say nothing about dirt bugs and lint. By C. T. Nadovich

MORSE!   Practice Morse code with this program by Norman Parron. (As you might guess, this · program requires sound...)

COPS   It's Cops vs. the Crooks. A game of skill and courage on a 25 by 25 grid. Idea by Sheila Dolgowich.

COMING   Amaze your friends: turn your 97 pound Pet into a _____.

MORE ABOUT THE PROGRAMS

MATCH... David Platton wrote this game which is based on an idea by Julia Hallford. An 8 by 8 grid is constructed covering 32 pairs of Pet graphic symbols. One to four people can play, with each being able to uncover two squares per turn. When you uncover both members of a pair in one move, those spots on the grid are cleared, thus making life quite a bit easier for you. The game ends when the board is cleared, or when someone resigns by pressing [R].

SEARCH... Hal Carey wrote this program to generate word search puzzles, which are then printed on the Pet printer. The words for the puzzle can come from one of two places: you may enter up to 25 words from the keyboard, or let it use the list of words from the DATA statements at lines 1410-1440. (The first word in the list is the subject of the word search, and the list must end with a null string. The variable MW in line 100 controls the maximum number of words. If you have more than 8K of memory, you may want to increase that limit.) It is interesting to watch the program try various possibilities as it tries to fit words together. Each time you run the program, you'll get a different puzzle, due to the random starting position used for the first word, as well as the overall logic of how words are fit together. In the case of a word which cannot be overlapped with another word in the list, the program temporarily puts that word aside, and continues fitting other words. After it has finished going through the entire list, it then attempts to use the words that previously wouldn't work. It keeps cycling through until such a time as it cannot fit any of the words left over into the puzzle. If you have put something like "zzz" into your word list, the program will probably discard it, (having given it the old college try).

BAT!... In the special universe of computer amusements, you'll find that such mundane things as zoological propriety are violated with abandon. BAT takes advantage of this "programmers' license" in order to bring you a delightful (although difficult and frustrating) exercise in flying. You control a "super bat", and face the challenge of eating enough insects to stay alive. Incidentally, sound is very important for this game: while you can play it without sound, it is much more fun with the sound effects. Life is far from simple for super bats: you have gravity to contend with, as well as your own inertia. Translated, that means that a super bat is a hell of a difficult little animal to fly. You control the beast by the standard convention of the numeric pad: [8] accelerates you up, [4] takes you to the left, and [6] to the right. (Editorial comment: Although there is a functioning [2] for "down", what with gravity always pulling you down, it's hard to imagine when you would care to use it.)

The plot thickens: our little super bat is very, very "bouncy". In fact, bats that survive longer than about 30 seconds learn to eat bugs while they bounce. They also learn the (varying) food value of different bugs. Please see the directions in the program, as we can't adequately represent the characters used for the bugs here. Don't give up too soon: once you get the knack of flying super bat people will have trouble prying you away from the keyboard.

MORSE!... Samuel Morse (to say nothing about the ARRL) would be proud: with this program, you can learn Morse code, or just brush up on your rusty" code. Naturally, the program requires that you have CB2 sound for your Pet. (CURSOR #3 has a diagram showing how to connect your Pet to an amplifier) MORSE! is designed to help you improve your skill in copying code, but not in sending it. In line 210, you can change the variables DI, which controls the length of a "dit", and the variable DA, which is the length of time between characters.

COPS... This is a two player game which uses a 25 by 25 gameboard to simulate the streets of New York (or is it London?). The rules are simple: the "crooks" drive an old 1953 Chevrolet, and have no respect for the traffic laws. Since their car is old, they can only move one square at a time. However, they are able to move in any direction, which helps them try to escape from the cops. The cops observe all traffic laws, which means they cannot turn left. But they drive shiny new patrol cars that go twice as fast as 1953 clunkers! The game is officially called "the hamstrung squad car", and was discussed in the Mathematical Games column of the February and March 1967 issues of Scientific American.

COMING... This little program reflects a bit of late night craziness. It does not pretend to be useful, but you may have some fun the next time that a friend tries to use your "very new" ROMs. Enjoy!

COMPUTER PROGRAMS AND YOUR ETHICS

As you know, our philosophy has been that good software that is reasonably priced will not be stolen or ·ripped off" to any great extent. We have deliberately priced our product as low as possible, thinking that most people are honest, and will not make copies for their friends. We have gotten some really nice mail from people who appreciate our policy, and who are respecting our rights to not have our programs copied. To the majority of our subscribers we want to say "Thanks for your support!". We are sorry to say, however, that there is some pretty good evidence that a significant number of people are not being fair to us about copying our product.

I'd like to explain some background that may help you understand our concerns about software theft. First of all, we are not a volunteer club. We purchase programs submitted to us by subscribers, and we also write programs ourselves. Work submitted to us is often extensively edited, and sometimes completely rewritten. We have a modest office, and of course some Pet computers and peripherals used to produce the magazine. There is a significant amount of clerical work to produce and ship each issue, to fulfill back issue orders, and to maintain the mailing list. (You wouldn't believe how often people move!) What I am saying is that the people who produce CURSOR expect to be paid for their work, just as you are paid for your job. (Which is not a suprise, I hope.) Volume is very important to us: it costs a great deal to produce the first tape each month. It is only when our subscription base is quite high that we realize any profit at all.

A special problem is that there are a few user groups who are "sharing" commercial software. Please realize that there are also many Pet user groups that are very careful to avoid "swapping" commercial software. Computers are fun, and user groups are valuable to Pet owners as a way to share information and software written by the members. Please raise the issue of protecting commercial software at the next meeting of your user group.

So what does this all mean? The personal computer user – you – should realize that software is a product that costs money to produce, and that when you make a copy for a friend, you are hurting yourself and other users, as well as the vendor. In the case of CURSOR, we publish source code that you are able to study and modify. One option, (which we don't especially like), is to use one of several protection schemes so that it is not possible to copy or even look at our programs. We hope that we don't have to do that, as we think that it would make CURSOR less attractive to many of our users. From time to time we wonder whether the ripoff factor is so great that we are just stupid to continue producing a consumer product. (Software sold to corporations is much less vulnerable, as it is sold or leased under a license agreement, and the majority of firms are not willing to risk a lawsuit just to save a few dollars.) I would appreciate two things: first, please drop me a postcard (unsigned if you like) telling me your opinions on software ripoff, especially how much you think CURSOR is illegally copied. Second, please tell a friend or two about us. Word-of-mouth advertising is remarkably effective, especially from a satisfied user.

ABOUT THAT "AT SIGN" BUG IN THE 2040 DISK OPERATING SYSTEM

In Cursor 13 we briefly mentioned that it isn't a good idea to use the at sign "@" as a way to replace files on the 2040 disk. The bug is especially insidious because of the way it affects your files. Let's say that there is a program on the disk called "BLAT6", which you have just finished editing. Since you want to replace the old copy, you might type:

        SAVE "@1:BLAT6",8

Your file will be saved, and will in fact replace the previous version. So what is the big deal? Simple: now and then, some other file on the disk will be damaged by this operation! Not the one you just saved, but some other file. (That's what makes it so dangerous: there is no immediate evidence that anything has gone wrong.) Since a portion of any diskette is usually empty (in fact, I'd bet that most people work with disks that are half empty), the damage may occur to a block that is not part of one of your files.

The solution is not elegant, but it works: NEVER EVER USE THE "AT SIGN" TO REPLACE FILES. Instead, go to the extra trouble to scratch the old copy, and then save the new copy as though it were a brand new file.

To the best of our knowledge, Commodore knows about this bug, but has not made the information available. Will it ever be fixed? That is an interesting question. When you realize that the 2040 is being sold to lots of people, and that it still does not support easy-to-use random access files (where you open a file, and tell the system "give me the 45th record"), then one does begin to wonder. When you realize that the 2040 doesn't communicate errors to the user at the console other than by turning on an easy-to-ignore red LED (for 50 cents they could have put a small audible noisemaker in it, just to warn you of errors, since the Pet itself doesn't know), then you realize that the "at sign" bug may never be fixed.

There is a much more important issue: Commodore is not providing the level of support that a serious computer system requires. IBM, Data General, and DEC don't fix all of their software and hardware errors either. But all reputable computer manufacturers have an ongoing sytem of communicating known bugs and system problems to their users. I fully understand that in a low-margin environment like the personal computer market, such a service would require that users pay for it somehow, either through higher prices, or by a special fee. I would gladly pay Commodore to find out about engineering changes as they occur, as well as learning about software problems as they are discovered. As Pets (or "CBMs") enter the mainstream of computer applications, it will be essential that we get a significantly higher level of support from the computer manufacturers. (Rumor has it that Apple is already light years ahead in this department.)

NOTES FOR

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PUBLISHER
Ron Jeffries

EDITORIAL DIRECTOR
Glen Fisher

ASSISTANT EDITORS
Diane Grove
David Platton

CIRCULATION
Jann Jeffries
Carol Peterson

THE CODE WORKS

A CURSORY GLANCE

There are several interesting facts to pass along this month about adventures in Commodore Land. We've peeked inside the new plastic Pet, and guess what we found? Two rectangular holes, right behind the Commodore label. These holes are exactly the right size for mounting floppy disk drives, and in fact the appropriate bolt holes and mounting brackets are already in place. From what we hear, it will be a while before the machines are delivered with floppies installed, as Commodore has run into some delays in getting the new drives in the quantity that they need. The new drives will be somwhat different from those in the 2040 disk unit. In order to reduce the cost of the floppy drives, Commodore has worked closely with the floppy manufacturers. One of the things they have been able to do is to design the unit so that it will work ok with slightly looser mechanical tolerances. As a result, the new model disk will have a couple fewer tracks. What about compatibility between the old and the new? You will be able to read disks from the 2040, but won't be able to write disks for it. From what we hear, Commodore is very sensitive to the issue of "upward compatibility", as well they should be. (At least some of you remember the hassle created by the reorganization of some of the operating system locations when they went to the upgraded Basic ROMs.)

Which brings us to another item: there are _new_ "new ROMs" coming! As we go to press, we don't know the details of what we can expect to see in what will be called (we think) Version 4 of Basic, but we have some ideas. One important thing will be that the Pet will know about the disk. Since we don't have details, we can't evaluate how good a job they have done in integrating the Pet operating system with the 2040 disk system, but from what we've heard, things sound pretty good.

Speaking of disks, you might have noticed that we have not been complaining about the 2040 disk lately. The reason is that ours is working fine, given the limitations we have reported. (See Cursor 14 for an important note about the dangers of the 'at sign' as a way to replace files.) Our 2040 has been reliable, and we use it pretty hard. (We have strictly stayed away from trying to use their random access files, which are just plain clumsy.) Our mutterings about the disk recently are all concerned with ease of use. While the DOS Support program (often called "The Wedge") alleviates a lot of problems, it introduces some of its own. Many machine language routines were written that go into high memory, exactly where the wedge was put! Result: you get to choose between using the wedge and using the other program that needs to be located at the same place. An annoying inconsistency is that you may use the wedge to load programs from disk, but you can't use it to save programs on the disk. So what? Well, the rules are different, that's what! With the wedge you don't have to use quotation marks around file names (which is very convienient). Also, you don't have to refer to the "unit number" of the disk. But... when you are ready to save a copy of the same file, you use the built-in Pet command, e.g. SAVE"0:BLAT",8 where you are obligated to use quotes and the unit number. Let's face it, the wedge really helps make the disk easier to use, but it is what is known in the trade as a "patch" – it was done after the fact to rescue their product from the sticks and arrows of angry users. Now, thank goodness, they've had time to go back to the drawing board and do things right, or so we hope.

In case you wondered, the "old ROMs" were Version 2, the "new ROMs" (those that have been shipped with the 16k and 32k machines for the last year or so) are considered Version 3, and the newest ROMs will be Version 4. We aren't sure, but there may also be a "Business Basic" brewing, which would logically be called Version 5. Finally, improved disk ROMs should soon be available too. The big news is that there will be REAL easy-to-use random access files. There will also be some changes in the code that should improve the reliability of the system.

CURSOR 15 HAS THESE PROGRAMS:

COVER15! The Christmas carols are by Ken Morley, and the graphics are by Glen Fisher.

DUNGEON You are trapped in a dark, dank dungon, trying to find gold (at $600 an ounce), and kill the beasts that attack you. By Brian Sawyer.

FIFTEEN The classic puzzle where you try to get the fifteen numbers arranged numerically. By David Platton.

GOMOKU You play Gomoku against a tough (and fast) computer opponent. The object: place five "stones" in a row. By David Malmberg.

EVEREST You are an armchair mountaineer in this entertaining simulation by Brian Sawyer. (Watch out for avalances and blinding snowstorms.)

HAWAII! Another animated cartoon from Ken Morely.

My own pet notion is that in the world of human thought generally, and in physical science particularly, the most important and most fruitful concepts are those to which it is impossible to attach a well-defined meaning.

H. A. Kramers (1947)

MORE ABOUT THE PROGRAMS

COVER15!... Happy Holidays from the Cursor staff! Our Christmas tree brings you music via CB2 sound. See Cursor #3 for a diagram of how to hook up sound to your Pet.

DUNGEON... The evil magician Trent has transported you into the depths of a set of dungeons filled with various bloodthirsty creatures. There is a way to escape: you must find (and take) all the gold hidden there (which is protected by those beasts mentioned before). However, the magician who constructed the dungeons was particularly fiendish: some of the rooms have no way in (except through the walls). Those rooms may have gold in them, too. The entire dungeons are surrounded by a completely impenetrable wall.

On the screen you will see a display of the dungeons. Your position is marked by a dot. Gold is marked by a 'G', and creatures by runes of various sorts. Open space that you've been to is white, and walls are black. (Anyplace you haven't been is black, too, even if it is open.) The doors between rooms are marked by a grey square. (The doors have spells on them preventing creatures from passing through them.) The impenetrable wall is shown as a checkerboard pattern. At the top of the screen is a line showing your 'hit points', your experience, and how much gold you've found. Hit points are a measure of strength; the higher your hit points, the stronger you are. You go up in experience as you defeat the creatures that lurk about. (You die if one of them defeats you.) Equally, the more experience you have, the stronger a creature you can defeat (assuming you have the necessary hit points). To move, use the number pad in the usual way: 8 means up, 3 means down and right, and so on. To move through a wall (this is magic we're talking about here, remember) hold the SHIFT key down when you press a number key. Naturally, moving through walls takes more of your strength than moving through rooms. Also, it is possible to rest, and recover your strength. Pressing '5' (no movement) allows you to rest for one turn. Be careful when and where you rest: the beasts have no mercy, and will attack you even if you do nothing. To throw yourself on the mercy of the evil magician, press 'Q' (for Quit).

FIFTEEN... This is our version of that hoary old problem, the Fifteen Puzzle. For those of you who have spent their lives in the magician Trent's dungeons, the object of the fifteen puzzle is to rearrange tiles with the numbers from 1 to 15 on them into numerical order. The tiles are arranged in a four-by-four square (with a hole where the sixteenth tile would be). You are allowed to move one tile at a time into the hole (which moves to where the tile was). In our version, you move the tiles by pressing the appropriate key on the number pad: '8' moves a tile up into the hole, '4' moves a tile left, '6' right, and '2' down.

One of our staff (who shall remain nameless) has fond memories of the cheap plastic version of this puzzle that he used to play during long, boring church services when he was a boy. I suspect that our Pet version will never be used for the same purpose...

GOMOKU... The object of Gomoku is to place five "stones" in a row, on a 14 by 14 board. (Yes, we know that it should be 19 by 19, but what do you expect in 8K?) It is very much like a grand tic-tac-toe, but you'll find that it is much more difficult. You have the option of playing either White or Black, and can select the style of play that the computer will use against you. You move by using the usual numeric pad keys, (8 means up, 2 down, 4 left and 6 right). When you have moved to the spot where you want to place a stone, just press "RETURN". The Pet will begin considering its move - you'll see a flashing white square bouncing around. When it selects its move it will report where it moved, and will place the cursor at that spot, and flash it.

EVEREST... Here is your chance to fulfill your lifelong ambition to climb Mt. Everest. There are the usual problems that hinder any climbing party: there are sharp crevasses, and steep, slippery slopes. (We've taken a few liberties, given the limitations of the two-dimensional CRT: the higher the number, the deeper the snow. So, zero is very easy climbing, and nine is damned difficult.) As the game begins, you'll see a diamond at the bottom of the screen, which is how we show where the climbing party is. You move by using the numeric pad (8=up, 7=diagonal up to the left, etc.). You'll soon encounter avalanches and snowstorms as you begin your assault. Avalanches have two effects: first of all, they are not very healthy for climbers. However, they do tend to knock the edges off of the ice, and so you'll find that they reduce the difficulty of the terrain that they pass over. The snowstorms have the opposite effect, and consequently make the climbing more difficult. Lucky for you, there is a wind indicator to the right of the screen. It will show you which way the wind is blowing, which may help you avoid the storms. Oh, one more thing: from time to time you'll slip as you climb!

HAWAII!... The continuing exploits of those guys from Canada (continued from Cursor 12).

BUGS IN MACHINE LANGUAGE MONITOR

There are a couple of problems with the machine language monitor. When you use the "L" command to load a file from the monitor, it sets the status variable. However, when you do a second load, it does not first reset the status variable! Result: you only get one byte loaded the second time. The second bug occurs when you try to save a file from the monitor. Seems that it won't save the very last byte that you specify. Since people often save a larger chunk of memory than absolutely necessary, this one doesn't hurt you as often as it might.

THANK YOU

The response to our comments in the last issue about the ethics of copying software has been very interesting. To summarize briefly, people do NOT want us to "protect" programs in such a way that they can't look at the source code, since many people study Cursor programs as a way to learn how to use the Pet more effectively. There will be times when machine language has to go at the end of a program (such as GOMOKU this month). But we have no plans to make our code unreadable to you! We've had very friendly mail about the ripoff problem, much of it in the vein "Well, I 'borrowed' one copy of Cursor from a friend, but is was so good that I went ahead and subscribed." Then there is also the fact that COMPUTE, the new 6502 magazine, reprinted our article in their second issue, and responded to our comments in a very helpful way.

To all of you: thank you again!

A CURSORY GLANCE

This month I have some things to report which were gleaned at a one-day visit to the Winter Consumer Electronic Show in early January. When I arrived at the Las Vegas Convention Center, my first problem was explaining to a bored clerk what Cursor is. Evidently, her responibility was to keep out the riff-raff, and she seemed to think that producing computer software didn't have much to do with electronics. Finally, she decided that I must be a manufacturer, gave me a badge, and sent me on my way.

It is difficult to summarize the bits and pieces of rumor, innuendo, fiction and fact that seem to be the product of these shows. There is a broad division between products that are officially introduced, and those that are shown (usually not at the main exhibit) simply to learn how dealers and others will react. It's also important to realize that there is often a significant delay between the announcement of a product and the availability of that product from your local dealer. From what I heard at the show, Commodore officially introduced two products: the 80 character Pet, and a new disk system with dual 5 inch Micropolis floppies which has a storage capacity of about a million characters. We probably won't see either product until May or June.

The prototype 80 character Pet is a very hot new product! The screen definition is about as good as I've seen on the best commercial CRT terminals: crisp and clear, right out to the corners. The machine has a 12 inch screen, and is packaged much like the original Pet, except that there is less space between the screen and the keyboard. In fact, on the prototype, there wasn't room to mount floppy drives between the screen and the keyboard. The 80 character Pet uses what is called a 'video controller', a specialized chip designed to control the functions of a CRT display. I wasn't able to do anything except poke at the keyboard a few minutes, but I am led to believe that one feature we can expect is the ability to control independent 'windows' of text. One example of a practical use of this concept is the Programmer's Toolkit from Palo Alto ICs, which uses a small window in the upper right portion of the screen when 'tracing' the execution of a Basic program. When such capabilities are directly available in an easy-to-use fashion, we'll all find numerous applications that will be well-suited to 'windowing'. It will be interesting to find out what the new Pet will cost. If priced correctly, Commodore may be able to capture a large share of the small business market.

The new machine may make it possible for Commodore to compete with the new Radio Shack Model II. There is a problem, however: the Radio Shack uses a Z80, and you can buy CP/M Version 2 for it from several sources. This means that all that CP/M software is immediatly available on the Trash II. You don't suppose that Commodore will design a Z80 or 8086 based computer, in order to get on the CP/M bandwagon, hard disks and all?

CURSOR 16 HAS THESE PROGRAMS: (Names ending with '!' use CB2 sound)

COVER16   Press any key, and the patterns will be filled with that character. A shifted space gives you blanks again, and a regular space brings in the Table of Contents. By Tony Schettino.

NAB!   It's you against the computer, as you try to escape a head-on crash. By Malcolm Michael.

FIRE!   You pilot a Fire Department helicopter as you try to put out a blaze. By Brian Sawyer.

ALIENS!   The aliens are attacking, but you can protect earth by destroying them before they land. By Mike Hamilton.

BONZO!   Randall Lockwood wrote this game of the Bonzo Dog Chase.

CATCH!   Play catch with the Pet. By George Leotti.

MORE ABOUT THE PROGRAMS

Every program this month uses the Pet's CB2 sound. Remember that if you hit the [STOP] key, you might leave things in a state of disrepair. There may be two effects: the sound may continue, and you may not be able to SAVE a program. You can correct this condition by typing three commands: POKE 59464,0: POKE 59466,0: POKE 59467,0

NAB!... It's you against the computer as you try to avoid a head-on crash. You control the solid white dot by using the numeric pad in the usual fashion: [4] moves you left, [6] is right, [2] is down and [8] is up. However, you can only change lanes at the four shaded intersections! Each plus sign that you drive over gives you 10 points. Once your score passes 1000, your opponent begins to lay down diamonds, which are worth 20 points each. We are not responsible for Pet keyboards that are worn out playing this game.

FIRE!... You pilot a Fire Department helicopter that drops water on a dangerous fire in a high-rise apartment building. Your chopper has 1500 gallons of water initially, as you are launched from the roof of a near-by building. Again, the numeric pad is your control, with [4] moving you left, [6] right, [2] down (useful when you go back to get more water), and [5] being your control to drop water on the fire. If you aren't able to put out the blaze in 3 minutes, the folks in the apartment perish. When you run out of water (always at the worst possible time...), you'll have to fly back to the right of your screen and resupply. This program uses sound, but if you see smoke, turn off your Pet immediately.

ALIENS!... The aliens are attacking Earth. You, at the helm of your Pet, are responsible for repelling the attack. The rules are very simple: as soon as a single alien reaches Earth, we all die. Press [4] to move left, [6] to move right, and [SHIFT] to fire a missle.

As you demonstrate your prowess at destroying aliens, they will send in their better (and faster) troops. May the Force be with you.

BONZO!... This amusement has many names, but we like 'The Bonzo Dog Chase' best. (Mr. Lockwood tells us that it was a big hit in 1930.) The game is for one or two people, with the Pet optionally joining the fun. After the players enter their names, a die is rolled. Press any key (except [STOP] of course) to end the roll of your die. Your marker will advance that many squares on the board. Should you have the good fortune of landing at the bottom of a ladder, you'll immediatly climb the ladder. But, should you somehow land at the top of a chute – whoosh! – down you go, and have to start climbing again.

CATCH!... You play the familiar game of catch with the computer. You move by using the numeric pad. (Don't forget that you can move diagonally. For example, pressing [1] will move you toward the lower left corner of the screen.) In this game you'll notice that some balls are thrown that are tough to catch, but it is always possible to catch them!

BUGS

In Cursor 15, there was a problem which only happened with 'old ROM' pets in the Hawaii! program. Please change line 450 as follows:

```
From: 450 PRINT E$"[UP]" TAB(13);
  To: 450 PRINT E$: PRINT "[UP][UP]" TAB(13);
```

Note that [UP] means 'cursor up'. The effect of the bug was that there were two masts on the boat. An unrelated problem is that Hawaii doesn't 'clean up' the sound registers when the program ends. You might want to change line 1580 as follows:

```
From: 1580 END
  To: 1580 POKE 59464,0: POKE 59466,0: POKE 59467,0: END
```

A note about GOMOKU: The author of Gomoku wrote it to enforce a rule that we neglected to tell you about: the play of a single stone may not create two open-ended three-in-a-rows at once.

A CURSORY GLANCE

At the Winter Consumer Electronics show Commodore showed a number of possible new products. Note that I said 'possible', not 'probable'. One that was fascinating was the 'touch screen'. With this feature, you are able to simply touch the screen of the Pet to give it commands. For example, imagine a menu of program options displayed on the screen. You touch the box marked 'Edit' and the program immediately goes into a text editing mode. There was an interesting demo at the show which used the 2040 disk and the prototype touch screen Pet. On the screen was a menu of games, and when you touched which game you wanted that program was automatically loaded and run.

It's anybodys guess whether the 'Touch Screen' will ever see the light of day. One rumor I heard was that the entire project was put together for the show in less than two weeks. The hardware is fairly simple: the plastic panel around the front edge of the CRT screen is replaced with a slightly thicker version that has infrared LEDs along the left and bottom edges, with sensors that 'see' the infrared light beams along the top and right edges. So, when you point to the screen, your finger interrupts two light beams, one that goes from the bottom to the top of the screen, and another that goes from left to right. As you can see, that gives the Pet an x-y coordinate that your program can work with. (Things are a little more complicated, since your finger may well interrupt more that one beam of light. In that case, the program probably will choose to interpolate a value.) I first saw this technology demonstrated about six years ago on a much more expensive system. There is no question that such a system can be built-in to a Pet or some other computer. The real question is how many people want it, and what are they willing to pay for the function that it provides.

There were other items at the show that have varying probabilities of being marketed. One was an entirely new 'home computer' (whatever that is) that attaches to your color TV set. It was definitely a prototype, and all I saw it do was flash pretty patterns on the screen. Unofficial word is that if Commodore decides to introduce the color computer that it will be priced 'aggressively'. (If you aren't a marketing person, that means: 'cheap enough to scare Atari'.) Will they or won't they bring out their toy computer? My feeling is that they would be mauled by Atari, and the new color Radio Shack.

Will there be a hand-held Pet in a couple of years? Well, if there isn't, other companies will market 'tiny computers' instead. Have you heard about the new Sharp hand-held 'calculator' that uses a reasonable subset of Basic? Price will be about 140 dollars. You can buy an adapter that lets you use the Sharp microcassette unit to save programs. With the Sharp 'calculator' (and I think that is a gross misuse of the language) you can only look at one line of your program at once.

CURSOR 17 HAS THESE PROGRAMS: (Names ending with '!' use CB2 sound)

COVER17   Stephen Rosset created this flashing rectangle design.

POLICE!   As Chief of Police you try to protect the city against a crime wave. By Kurt Carpenter.

SPOT   Two players compete to stack four markers in a row. Art Carpet wrote this challenging game.

RULER   Kids will enjoy learning how to read a ruler in this educational program. Based on an idea by David Dwyer.

LETTER   Big letters (and numbers) will appear on your Pet screen when you press a key. By Michael Contino.

MERGE   Combine two Basic programs, merging them by line number. (Requires 2040 disk.) By Glen Fisher.

NPACK   Squeeze all the blanks out of your flabby Basic programs. (For New ROMs only.) By Glen Fisher.

MORE ABOUT THE PROGRAMS

POLICE!... You are the Chief of Police of East Flatbush, a town with freeways, streets, and all the businesses of any prosperous town. But there is trouble in East Flatbush: a master criminal is on the loose! Although you have already set roadblocks at all the exits, the town continues to be plundered. Your job is to hunt down the scoundrel and arrest him (or her).

A map of the city shows some of the locations where crimes may be committed: banks [B], a shoe store [S], a candy store [C], traffic lights [L], hazardous locations where accidents may happen [A], and a park where muggings occur. To drive the squad car, use the number pad in the usual way, 8=up, 2=down, 4=left, 6=right, 5=stop. But until you are within one block of the suspect, you cannot see him. Your only clues are the crime reports, as produced by the East Flatbush Police Effectiveness Transmitter (which most of the officers call 'PET' for short). When you spot the criminal, shown as an asterisk [*], he will stop his crime spree and the chase is on. Your object is to trap him between you and a roadblock. You may set up to 7 roadblocks by hitting [SPACE] as you pass a strategic spot. You'll want your CB2 sound connected to fully appreciate this clever little fantasy!

SPOT... This popular game pits two players against each other trying to get four pieces in a row. The board is a rack of seven columns of six squares each. Players take turns selecting a column in which to drop one of their pieces. The piece falls to the lowest empty square of the column. The first player to get four in a row – horizontal, vertical, or diagonal – is the winner. The game can be very challenging, with some unexpected twists as the game progresses. As they say: plan ahead!

RULER... This is a 'skill building' program which teaches little people how to read a ruler that is marked in inches. We realize that the world is going metric, but there are still lots of rulers in the U.S. that use the English system. (Great Britain has many things to be proud of. Their system of measurement isn't one of them!) A ruler (not drawn to scale) is presented on the screen, and you are asked to show on the ruler a line of a certain length. If the line you draw is too short, it is extended to the correct length and the Pet tells you how much too short the line was. Likewise, if the line is too long, it is corrected. Ten of these excercises are presented, and then your score is displayed.

LETTER... Here is another program designed for youngsters. LETTER will draw a big picture of any letter or number that you press. A unique feature of the program is the way that the author used just a few general subroutines to produce various portions of letters.

MERGE... Those who have the 2040 disk system will be able to use this handy utility to combine two Basic programs on disk to make a third file on disk, keeping the line numbers of both input files, (unlike some other so-called merge programs that merely tack one file onto the end of the other). Where a duplicate line number exists, the program reports the fact and copies the line from the first named input file. MERGE shows a dot on the screen for each line of the program that is processed. We use it to place our standard 'framework' code (lines 0-99 and 60000-62099) around user contributed programs.

NPACK... An unfortunate aspect of small computers is the extent to which programs have to be practically unreadable in order to fit in a small space. There are a number of ways to conserve space in a Pet Basic program, such as putting multiple statements on a line when possible. The way that the Microsoft Basic used by the Pet works is that all of the Basic 'keywords' (such as IF, PRINT, GOSUB, etc.) are converted to 'tokens', each of which is unique, and stored in only one character (or 'byte', if you want to sound like a computer science type). As a result, you don't have to have any blanks between tokens in Pet Basic, and that fact lets you save quite a bit of space. But taking spaces out by hand is painful at best, and pretty boring.

This program removes all blanks from a Basic program (except those within quotes or in remarks). To use it, run NPACK, which loads machine code into the second cassette buffer. Then load any Basic program and type SYS(826), which tells the Pet to go to location 826 (decimal) and execute the machine language program, and then return control of the machine to you. Please note: NPACK works only with new ROMS. If you have old ROMS use PACK from Cursor #6 for January 1979.

NOTES FOR

CURSOR
Programs for PET™ Computers

NUMBER 18

March 1980

A CURSORY GLANCE

There's a new price list out from Commodore that includes some of the new products we've all been wondering about. The new 80 column Pets will be called the CBM 8016 and 8032. These machines cost $1,495 and $1,795 respectively, or about $500 more than their 40 column cousins. There are two major differences: the display screen presents twice as much information as the 40 column model, and you can define a text 'window' where all scrolling occurs. For example, you can define a 'window' that begins on line two, and includes the rest of the screen. This would let you have a one-line status display which would not be affected by your normal printing in a Basic program. There are a couple of other enhancements, including the ability to insert and delete lines, and to erase to the end of a line. (These are useful in a program. They are not directly available from the keyboard.)

The other big news is the 8050 disk which gives you over 950K characters of storage on two 5 1/4 inch mini-floppies. Price:$1,695, or $400 more than the current 2040 disk, which has 341K net storage capacity. I haven't used the new disk unit yet, but from what I've heard it should be a good unit. They are using Micropolis drives, which have a solid reputation and have been well proven. Obviously, the additional storage capacity is very important in many serious applications. However, if you don't need the extra storage, the 2040 is quite a bit less expensive, and since it has been upgraded it is very reliable. As you may realize, disks written on one unit can't be read by the other, as they use completely different formats. Commodore dealers will probably offer a disk copying service where they read 2040 disks and write 8050 disks, by using two different drives.

There are two other new items, also due for June, 1980 release: a CBM modem for $395 which lets you talk to timesharing systems, such as the Source and MicroNet at 30 characters per second. There is also a Voice Synthesizer (for $395) which uses 'phoneme synthesis' to produce speech.

The major competition that these new cmputers from Commodore face is the Radio Shack Model II, which is an impressive computer for business applications if you buy the CP/M operating system. With CP/M you have immediate access to a wide range of application programs, as well as languages. On the other hand, the new CBM 8032 is in some ways a nicer machine than the Trash II, and at $3,500 with the 8050 disk, it is more than price competitive. The 8016 or 8032, combined with the 8050 disk and the 2022 printer is an excellent business system.

Other notes: COMPUTE is the new magazine published by Robert Lock. After three issues, my opinion is that COMPUTE is here to stay, and that every Pet/CBM owner ought to subscribe. It is only $9 for six issues, and you'll find lot's of Pet material in each one. As you know, COMPUTE took over Gene Beal's Pet User Notes (which always had good information), as well as Len Lindsay's Pet Gazette, and Eric Rehnke's 6502 User Notes. Robert Lock seems to have a vision of a user-oriented 'resource' magazine that is bound to come true, given its performance so far. You can subscribe by writing: COMPUTE, Box 5119, Greensboro, NC 27403.

CURSOR 18 HAS THESE PROGRAMS: (Names ending with '!' use CB2 sound)
COVER18   Stacking Blocks – a graphic design by Peter Stearns.
DROMEDA!   The Cursor Creature Feature, a cartoon in living black and white. By James Carr.
JOUST   Computers in the Middle Ages? Well, put on your armor and challenge a friend to a joust. Brian Sawyer.
WEATHER   Predict the weather? Dr. Randall Lockwood wrote this very useful program.
HI-RES   Who says you can't do high resolution graphics on a PET? HI-RES gives you dot-by-dot control over a section of your screen! By Dave Dixon.
SHEEP   Herd the sheep into the barn before they eat the crops. By Peter Stearns.

MORE ABOUT THE PROGRAMS

<u>DROMEDA!</u>...   There isn't much to say about this excellent animated cartoon by Bob Carr. Except that you must have CB2 sound to get the full benifit! (Many people don't realize how powerful character graphics can be.)

<u>JOUST</u>...   This two-player game lets each player control a lance and a shield as they ride toward each other. The objective is simple: each player tries to knock the other to the ground. The player on the right types [7] to move his lance up, or [1] to move the lance down. The player on the right presses [9] to move his shield up, and [3] to move it down. On the left, the player uses [E] to move the lance up, [C] to move it down. [Q] moves the left player's shield up, and [Z] moves it down. Note that a knight cannot hold the lance and shield at the same level. So, moving the shield to the level of the lance causes the lance to move out of the way. If both knights are unsaddled, or neither knight is unsaddled, the round ends in a tie.

<u>WEATHER</u>...   The WEATHER program is provided as an example of how the Pet may be able to help you predict the weather. We make absolutely no claims that it is accurate or correct. With this program and a barometer you can experiment with comparing your predictions with those of your local radio or TV station. You'll need two barometer readings separated by 6 to 23 hours, wind direction, temperature, and sky condition. From this information, the program gives a forecast for the weather for the next 6 to 24 hours. The author says it even predicted a snow storm that the local weatherman missed.

<u>HI-RES</u>...   With HI-RES, you can control individual dots on the screen in a 9 character by 5 character area. As you are probably aware, you can write a program that changes the characters on the screen fast enough that your eye sees them both at the same time. HI-RES works in a similar way, except that it changes the characters faster than the Pet can redraw the screen. In other words, while the Pet is drawing one line of character dots, HI-RES is changing the characters in the screen memory to a different set, so that the next line of dots come from entirely different characters.

Thus, each line of dots within a character square can come from a different character. The way HI-RES works also forces a limitation on what you can draw with it: you can't put up a line of dots that doesn't come from some existing Pet character. Also, the screen redrawing is fast enough that HI-RES can only work on an area 9 characters wide by 5 character high. (One line of dots is displayed in a little less than the time HI-RES can change 10 characters. That is why a limit of 9 characters: the tenth would be progressively chopped short. Also, after 5 rows of characters, the ninth character is being eaten into, so the HI-RES display can only be 5 row high.) Those of you with old Pets will see a lot of 'hash' on your screen, due to the great speed with with HI-RES is changing screen memory (just like when you POKE the screen a lot). The new Pets are built so that changing screen memory doesn't make the 'hash'.

When HI-RES starts, it will display a sample of what you can do with it in the 9x5 area, and then print a prompt of '>'. There are six commands you can give it: Horizontal line, Vertical line, Fill area, Plot character, Spread character, and Quit. Here is how the commands are typed. (Note that brackets indicate that the item is option. Do NOT type the bracket!)

```
H pos [+step] length char
V pos [+step] length char
P pos char
F char
S pos char
Q
```

Positions are indicated by a row/column position. Rows are individual lines, within a character, so that there are eight rows per character. There are forty rows, numbered from 0 to 39. Columns are one character (eight dots) wide. There are ten columns, numbered from 0 to 9. To name a position, type its row and column, run together. For example, row 5, column 4 would be typed 54. Row 23, column 0 would be 230. The tenth column is not shown on the screen, since HI-RES can't quite change things fast enough, but there IS a tenth column.

The length of a line is how many positions will be changed. If twenty-three changes are made by a line, the line is 23 positions long. The 'step' of a line tells how many positions to skip between changes. A step of 2 changes every other position, and a step of 10 changes every tenth position.

A 'char' is the character you want put on the screen. If you want an asterisk, type a '*'. For a bracket, type '['. If you want a reverse-video character, press [RVS], and then type the character.

H (horizontal) draws a horizontal line made up of one character. If the line goes off the right edge of the 9x5 rectangle, it will reappear at the left, one row down.

V (vertical) draws a vertical line made up of one character. If the line goes off the bottom, it will reappear at the top, one column to the right.

P (put) puts the character in a specific position on the screen, and only there.

F (fill) fills the entire rectangle with the character chosen.

Q (quit) stops the HI-RES program, and puts everything back where it should be. If you break out of HI-RES (with [STOP]), things will be left in an odd state. In that case, type SYS ML to clean things up.

S (spread) lets you see the separate lines making up a character. It always changes eight entire rows. Column 0 is filled with the complete character. Columns 1 through 8 get one line of the character per column, with the rest of the column blank. This lets you see how the dots in one line of a character look, without being confused by the dots on other lines.

Some examples:

        H 43 4 *

draws a horizontal line starting at row 4, column 3, going right four columns. The line is made of *'s (rather, lines of dots from the * character).

        F [RVS]

makes the rectangle completely white.

        P 390 =

puts one line of dots from an equals sign into row 39, column 0 of the rectangle.

        V 100 +3 5 #

draws a vertical line downward, starting at row 10, column 0. Only every third position is modified, and five positions are modified. The positions are filled with dots from the #.

You can make a number of interesting patterns easily with HI-RES. Once HI-RES is running, give the following commands:

        F [RVS][shift-Z]
        V 0 +2 999 [shift-Z]

        F [RVS]+
        V 0 +2 999 +

        F [RVS][shift-V]
        V 0 +2 999 [shift-V]

SHEEP... Your faithful sheepdog Shep will help you herd the sheep into the barn. You control Shep with the numeric pad. A sheep moves randomly until Shep gets near. Then it moves away from the dog, and keeps moving until it is out of his vicinity. Get all of the sheep into the barn as quickly as possible. But keep them out of the crops! The sheep eat the crops, but Shep is not allowed to step on a plant.

THE OFFICIAL COMMODORE ROM GENEALOGY

The PET/CBM computer has been around now for over two years, and like all products, it has 'matured'. Translated, that means there have been changes, especially in the important system software that is stored in the Read Only Memory, known as the ROMs. Recently, I discovered that one of the ROMs in our old 8K Pet had a different 'dash number' than more recent 'old 8K Pets'. I called Chuck Fowler who is the Director of Customer Support at Commodore, and discussed the ROM part number situation with him. He agreed that it would be a good idea to put together a definitive list of the ROMs. So, Dave Jackson, a Senior Technician who works with Mr. Fowler compiled the list which we present here. Please note that there is a fairly important change in the ROM for the 2022 and 2023 printers. The new ROM, part number 901472-04, provides significant improvements in the performance of the printer. If you have a pre-December, 1979 printer, chances are you'll need the new ROM. The best news is that Commodore (after some prodding by Chuck Fowler) is providing the replacement printer ROM at no cost! See your authorized Commodore dealer to get the new ROM.

When the "PET 2001" first went into production September, 1977, there were two ROM Sets incorporated into the system. One ROM Set is the 6540 type ROM. This is a 28 Pin ROM which is manufactured by MOS Technology, Inc. You will find these ROMs in the following locations on the PET 2001-4 and 2001-8 Main Logic Board:

Location	ROM	Part Number
H1	6540-019	901439-09
H2	6540-013	901439-02
H3	6540-015	901439-03
H4	6540-016	901439-04
H5	6540-012	901439-05
H6	6540-014	901439-06
H7	6540-018	901439-07
A2	6540-010	901439-08

Note: There is an 019 ROM at the H1 location. On some earlier Main Logic Boards you will find a 6540-011 at H1. This ROM has been updated to an 019 due to an intermittent bug in the edit software. This ROM Set is Basin Level I.

The other ROM Set incorporated into the PET 2001 is a type 2316B 24 Pin ROM. You will find these ROM's in the following locations on the PET 2001-4 and 2001-8 Main Logic Board:

Location	ROM	Part Number
H1	901447-09	901447-09
H2	901447-03	901447-03
H3	901447-05	901447-05
H4	901447-06	901447-06
H5	901447-02	901447-02
H6	901447-04	901447-04
H7	901447-07	901447-07
A2	901447-08	901447-08

Note: There is an 09 ROM at the H1 location. On some earlier Main Logic Boards you will find a 901447-01 ROM. This ROM has been updated to an 09 ROM due to an intermittent bug in the edit software. Like the 6540 ROM Set, this too is a basic level I ROM Set. To determine what the 6540 and 2316B ROMs listed above are capable of, I would refer you to the "PET User Manual" Model 2001-8.

The next two ROM Sets are basic level II ROMs. They are also Retrofit Kits for the 2316 B and 6540 basic level I ROMs. The basic level II ROMs allow you to access machine language by using a SYS command. Basic level II allows you to interface the Commodore 2040 Dual Floppy to your PET. Basic level I ROMs will not allow you to interface the 2040 Dual Floppy to your PET. The basic level II Retrofit ROMs also clear up a bug in limiting the demensions.

If your PET has the basic level I 6540 ROMs, you would use the following ROMs which come in the form of a Retrofit Kit to upgrade your PET to basic level II.

Location	ROM	Part Number
H1	6540-020	901439-13
H2	6540-022	901439-15
H3	6540-024	901439-17
H4	6540-025	901439-18
H5	6440-021	901439-14
H6	6540-023	901439-16
H7	6540-026	901439-19

If your PET has the basic level I 2316B ROMs, you would use the following ROMs which come in the form of a Retrofit Kit to upgrade your PET to basic level II:

Location	ROM	Part Number
H1	901465-01	901465-01
H2	901465-02	901465-02
H3	901447-24	901447-24
H4	901465-03	901465-03
H5	Blank	
H6	Blank	
H7	Blank	

To determine what the basic level II Retrofit ROMs are capable of, I would refer to the "CBM User Manual" model 2001-16,16N,32,32N. Part number 320856-3.

The following ROM Sets are the ROMs that are currently being used in production. There are two sets of ROMs in use. If you have a graphic style PET, you should have the following ROMs in your unit:

Location	ROM	Part Number
D3	Blank	
D4	Blank	
D5	Blank	
D6	901465-01	901465-01
D7	901465-02	901465-02
D8	901447-24	901447-24
D9	901465-03	901465-03
F10	901447-10	901447-10

If your PET is a business style, you should have the following ROMs in your unit:

Location	ROM	Part Number
D3	Blank	
D4	Blank	
D5	Blank	
D6	901465-01	901465-01
D7	901465-02	901465-02
D8	901474-01	901474-01
D9	901465-03	901465-03

The ROMs in the graphic and business PET are basic level II ROMs. Again, I would refer you to the "CBM Users Manual" model 2001-16,16N,32,32N. Part Number 320856-3

The ROMs currently being used in production of the 2040 Dual Floppy are as follows:

Location	ROM	Part Number
UL1	901468-06	
UK1	Blank	
UH1	901468-07	.
UK3	6530-02	

These ROMs are at basic level II.

The 2022 and 2023 Printer went into production using a 901472-03 ROM at Location U11. This ROM has been updated to a 901472-04. By changing the 03 to 04 ROM, the following enhancement of features and error correction improvements were made:

1. Allow feed switch to generate a continous feed instead of 5 lines at a time (901472-03).
2. Head motor does not run when a Tractor Feed Printer performs a feed.
3. An extra carriage rtn. is no longer printed after the first line of print after power-up.
4. Cummulative cooling delay time added for reverse field characters.
5. Added secondary address 7 to latch Printer into default upper/lower case mode instead of upper case/graphics mode to work with PET business k/b.
6. An enhanced character printed in the first column position no longer loses the first dot column at random.
7. Auto line count adjusted to 66 lines per page default including the page eject control character. Line count was off by one line per page when compared to documentation and C-ITOH and practical automation software.
8. Corrections for the 6532 timer bug which caused overprinting (missed line feeds) on the friction feed version (90147-02) and were patched (901472-03) were assembled in line (901472-04).
9. In diagnostic mode the character set printed is the 64 character ASCII set instead of 64 characters and an extra blank.
10. In diagnostic mode, the ready light is lit after the RAM and ROM tests are passed. Thus if a bad mechanism is attached, more data is given about the nature of the board.
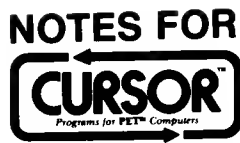
NOTES FOR

CURSOR
Programs for PET Computers

NUMBER 19

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THE CODE WORKS

A CURSORY GLANCE Ten years from now we'll look back and be amazed by the fact that the most visionary among us will have vastly underestimated the effect of inexpensive computer power. You'll notice that I didn't say "home computers" or "microcomputers" or "personal computers". Basically, those terms are all almost meaningless. To my knowledge, nobody knows what a so-called "home" computer is, or what it will do. "Microcomputer" describes how big the computer is, but nothing else. Of those terms, the one that comes closest to having some meaning is "personal" computer. Many of our CURSOR subscribers don't know what it's like to have to interact ("fight" is a better way to describe things) with a large bureacracy in order to be able to do a little simple computing. (I know. I used to be part of such an organization. Which goes to show that the people who work at those sort of places aren't all bad, right?) The essence of having a "personal" computer is never having to compete with other users for scarce resources. Sure, given a small computer such as a PET, you have only so much computer power at your disposal. But within that limitation, it's all yours!

Inexpensive, widely available computing power best describes the computing revolution that we are all living through right now. Commodore's PET and CBM computers are very inexpensive, given the amount of computer power that they provide. One of the fascinating side-effects of cheap computing is that lots of people who don't know any better are taking these machines and solving problems that "professional" computer people think can't be done on such "toys". When we look back in five or ten years, we'll realize that the computing revolution began in the elementary school and junior high school classrooms when they started turning kids loose with cheap computers. Even mighty IBM may never be the same, once a new generation of employees arrives, each one used to working with a PET or Atari.

OTHER NOTES You'll be seeing lots of Commodore advertising during the next few weeks. Just as this major new marketing thrust begins, it seems that there may be a big shake-up in Commodore's marketing division. One unconfirmed rumor is that the entire top layer of marketing people has already left. Since my telephone calls to marketing at Commodore have gone unanswered for the last week, I'm inclined to believe the rumors!

According to information from our friends at Compute Magazine and other sources, we think that Commodore has probably decided to go for the brass ring and introduce a new, low-end color computer to be called the **TOI**. Early units may be available in July or August. The TOI will be an interesting little machine. It will have a custom TV controller chip that will be quite powerful, (although probably not in the Atari class). We don't know how compatible the new machine will be with current PETs, but have heard that there will be some differences in addition to color and three-voice sound capabilities. It also looks like we can expect to see a new, cheap single disk drive unit from Commodore that will use the new, and very inexpensive 5 inch drive made in Japan for Shugart. Will those new little floppy disk drives show up packaged just above the keyboard of the PET? Yes, but we don't know when.

CURSOR 18 HAS THESE PROGRAMS: (Program names ending with "!" use CB2 sound)

COVER19   Perpetual steps. Animated display by Peter Stearns.

FROG!   Just what sort of frog are you? (You'd better be hungry...) By Bob Carr.

GODZILLA! Save Japan from the King of the Monsters. By Randall Lockwood.

MINER!   Grab your pick, drill, and some dynamite and mine for gold. By Ron Longfellow.

RAIL   You are the engineer in this tricky train yard. By Chris Torkildson.

GBOOKA and **GBOOKB**   Maintain a gradebook with these two programs by teacher Hal Carey. (Requires printer.)

MORE ABOUT THE PROGRAMS

FROG! This is another animated PET cartoon, but with a difference: you control the frog as you attempt to catch bugs and stay alive. Our old friend the numeric pad provides a way for you to control the beast. The controls are easy: all keys in the bottom row leave the frog sitting down, but extend his tongue a little [1], medium [2] or a lot [3]. The middle row causes the frog to jump up slightly, and the top row makes the little beast stand up as high as he can. Each attempt to catch a bug takes energy. As you might guess, it takes more energy to stand up and catch a fly than to just sit and catch it! And, just sitting around and watching the flies also drains you of valuable calories. There are various skill levels, with higher skill levels causing the bugs to move faster and the poor little frog to burn energy faster.

GODZILLA! Godzilla, the King of the Monsters is about to attack Tokyo! You control troops, a navy, an air force as well as ten missiles and a single atomic bomb. When Godzilla goes on a rampage, he inflicts serious casualties to innocent civilians. Repeated attacks tend to wear him down, but he has a remarkable ability to recover! You lose if more than 20 million people die. (The residents of Tokyo probably won't vote you "Most Likely to Succeed", either.) The map on your screen has 25 sectors, identified by row and column, with no space in between. For example, 02 refers to row zero, column two. Where moves are required, you type four numbers, with no space in between. Example: 1213 moves you from sector 12 to sector 13. The commands are:

I   Information. Shows the status of a sector, such as troop strength, population, ships and planes.
TM   Troop movement. This is how you move your land forces. Troops must stay on the land, and sailors at sea!
TA   Troop Attack. As Commander in Chief, you may attack Godzilla with your infantry.
SM   Ship Movement. Moves one ship between sectors.
SA   Ship Attack. Causes all ships in Godzilla's sector to attack him. Naturally, the more ships in that sector, the more powerful the attack.
M   Missile. Launches one of your ten missiles at Godzilla. Unfortunately, missiles also harm a lot of civilians, as well as your own troops.
AR   Air Raid. Launches a given number of planes from a specific sector, (if they are within range). Planes don't inflict damage on troops or civilians. (Who said this game was realistic?)
AB   Atomic Bomb. An extremely dangerous weapon that must be used with extreme caution, if at all. You can disable the bomb by deleting line 760 of the program.
Q   Quit. Does just that. Use **Q** to leave the game so that the sound registers get rearranged correctly.

MINER! In this game you are a gold miner, facing the normal hazards of a deep mine: there are cave-ins, (which sometimes cause you to lose all your gold!), as well as underground springs that will flood your carefully dug tunnels. You move by using the numeric pad [2] is down, [4] is left, [6] right, [8] is up and [5] means "stop". Naturally, the first thing to do is get in the elevator and move down. When you get to the level where you want to work, press [4] and start digging with your pick. Gold (or hazards, such as springs or hard rock) will occur at the dots. When you find gold, get in the elevator and deposit it in the bank! You have a drill [D], explosives [E], and a pump [P] at your disposal. However, using these tools costs money! You'll win the game when you amass $10,000.

RAIL This switchyard puzzle requires quick thinking, and even a bit of courage. A special train must be moved from the upper-right corner to a siding at the lower-left of your screen. You control the 12 switches in the yard by pressing the letter beside the switch. You must be careful to avoid hitting an open switch (which will cause you to derail), or running head-on into another train!

GBOOKA and GBOOKB These two programs do a lot of the "dirty work" of maintaining a teacher's gradebook. Note: the programs require a printer. **GBOOKA** is used to enter the list of students for a specific class. After you have entered the list, it is sorted, and printed on the screen for you to review. You can change any of the entries, add more names, or delete entries. When you are satisfied with the list, you can get a printed copy. The program assumes that you want to save and read cassette tapes on cassette number 1. You can change the variable FD% in line 100 to '2' if you want to use cassette drive number 2, or to '8' to use the 2040 disk. Note that the program always uses the same file name "GRADES", as it was designed mainly for cassette use. If you use the programs with disk, and have more than one class, you'll probably want to modify the program so that it asks you for a file name.

GBOOKB is used to enter grades for a new assignment, change grades, or to list the grades for all students. When you enter grades for a new assignment, you'll be asked for a four character assignment name, which will be used on the printed list to identify the assignment. You may also assign a weight for the assignment, (if you don't use weights, then enter a '1'). Grades are entered as percentages. You may indicate a missing grade by entering an asterisk '*'. The cut-points for assigning letter grades are used in lines 230-260, and of course may be changed to meet your requirements. After entering grades, you can get a printed list, which shows the four letter name for each assignment and the weight you gave the assignment. For each student, the program prints the student's name, grade for each assignment, their average, their letter grade, and the number of incompletes. At the bottom of the report you are shown the class average for each assignment. Naturally, after you've entered grades, you'll need to record the new information on tape or disk. (Again, line 100 controls the device where data is read and written.) We strongly advise you to maintain at least a three-tape system, i.e. don't ever record your most recent results "on-top" of the previous data file! There is too much risk of either human or computer error, and we don't want you telling your Principal "Well, I would have had my grades ready today, but I accidentally erased my data tape!"

Other comments: Line 190 of both programs controls the maximum number of students, (variable NS), and the maximum number of assignments (variable NA). If you are using an 8K Pet, use short student names, as the programs (especially GBOOKB) are tight on memory!

NOTES FOR CURSOR

CURSOR
Programs for PET Computers

NUMBER 20

May 1980

A CURSORY GLANCE

Commodore has started shipping 8K Pets with four holes drilled in the circuit board to prevent users from expanding the memory capacity to 16 or 32K. As you might guess, some users (and dealers) are very unhappy with this new policy. Funny thing: Radio Shack and Apple seem to survive the trauma of users adding memory to their computers. I can only hope that this unfortunate decision was made by one of the group of ten or fifteen employees that recently left Commodore, and that the new crew will change the policy right away. I can understand the company wanting to make a nice profit on the extra memory, and suggest that they do so by offering a memory upgrade service.

Commodore has a lot of interesting products that we'll see over the next several months. At the recent National Computer Convention show at Anaheim they showed a pre-release version of the language Pascal. From the demonstration that I saw, it looks promising. At this time it does not have random-access files, although they will be added later. The compiler reads Pascal source code and produces what is called 'P-code', (which is designed to be small and run quickly). The P-code is then interpreted by a 10K run-time system. The cost is expected to be about $250.

They also showed the new 'cheap' floppy disk. The drive is somewhat slower than the current 2040, and only holds about 130K characters per disk. The new drive will be able to read disks that were produced on a 2040, but will **not** be able to write disks for the 2040. The price hasn't been determined yet, but don't be too suprised if the single drive model costs about $600. Don't hold your breath waiting for one, because it will be at least September or October before you can hope to see one at your local dealer. (Minor sidelight: the new floppy will have only one 6502 microprocessor instead of the two micros that are in the 2040.) A dual 8-inch double-sided floppy system called the 8062 was also displayed at the show, although I did not see it running. It will store three million characters of data, and may well be a lead-in to a hard disk system. (Pretty soon, you will need a computer with a floppy disk just to keep track of all the variations of floppies (and ROMs) that Commodore is providing!)

There may be some excitement at the Commodore booth at the Summer Consumer Electronics Show in Chicago next month. It looks like they will have the new color Pet ready by then. (Although MOS Technology has had problems producing the custom TV controller chip.) There is speculation that the color Pet may be sold with 16K of memory for about $600. Another possibility is that Commodore will also show a new black and white computer that will be much cheaper than current Pets.

Remember the "new, improved 04 ROM" for the Commodore printer that was mentioned in Cursor 18? Well, it seems that the 04 fixed some problems, but introduced even worse problems. We hear that they are hard at work on the 05 ROM for the printer, and are using the 03 ROM temporarily for current production.

CURSOR 20 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)
COVER20   Plaid pattern. Graphics by Peter Stearns.
MUSIC!   The toy piano of the future. By Brian Sawyer.
BETS   Play "indian poker". By Randall Lockwood.
CHECKERS!   The Pet plays a modest game of checkers with you. By Tom Skibo.
CURVES   Display interesting patterns on the screen of your Pet. By Dave Goforth.
EQUIP   Maintain an equipment inventory.

MORE ABOUT THE PROGRAMS

MUSIC! With this program you can enter music at the keyboard of your Pet, and hear the notes as they are displayed on the screen. The picture below shows how the musical notes are represented on the Pet keyboard. (On the business keyboard, a semi-colon is used instead of a colon, due to the different placement of the keys.)

```
Note:    C# D#    F# G# A#    C# D#
PET:     Q  W     R  T  Y     I  O




PET:   A  S  D  F  G  H  J  K  L  :  P
Note:  C  D  E  F  G  A  B  C  D  E  F
```
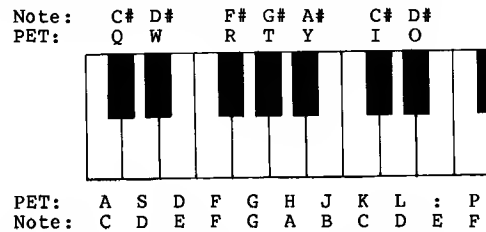
Other keys used: press [SPACE] to enter a rest (silence), and press [DELETE] to erase the previous note or rest entered. (You can delete as many notes as you like, up to the top of the screen.) The duration of the note is controlled by how long you hold down the key. The shortest note you can enter is an eighth note, and the longest is a dotted whole note.

Enter music by pressing the appropriate keys on the Pet keyboard. For example, to enter the notes "C D E F", press: A S D F. You will hear each note, and see it on the screen. If you make a mistake (or change your mind), just press the [DELETE] key. Each time you press it, one more note will disappear. When you have entered a few notes and want to hear them played, press [RETURN] to return to the main menu. To hear your composition, select option 2. While it is playing, you can stop it by pressing [RETURN]. When it is done, you will be asked if you want to add more notes. If you type 'Y', then you can enter more notes, or delete notes already entered. You can save your music as a file on tape or disk. The variable FD in line 100 controls the device for files. It is normally 1 for cassette 1, or 8 for the disk unit. If you have a 16 or 32K Pet, you may want to change the variable MS in line 101 which controls how many strings (of 38 notes each) you are allowed to enter.

BETS This game is sometimes called 'Indian Poker'. There are four players: you, and the three shown on the Pet. (Well, you only play three at one time. But there are six different individuals that you may face, each with a different approach to gambling.) Each person is dealt a single card, which they hold above their head. So, everyone gets to see the card *except* the person holding it! Each person has $200 as the game begins. The ante (amount each player must put in the pot when a new hand is dealt) is $10. You can bet either the same amount as the previous player (by just pressing [RETURN]), increase the bet, or 'fold' (give up) by entering a bet of zero dollars. The most any player can raise the current bet is $25. So, if Lucy bets $11, you can bet as much as $36 ($11 plus the $25 limit). After all bets are placed, the person with the highest card wins the pot. (Ace is high.) If two players win, they split the pot. The game ends when any player runs out of money, or when a player can't make the ante for the next hand.

CHECKERS! You play checkers against the Pet in this program. Enter moves by typing the beginning square, a dash, and the ending square. For example, to move from 50 to 53 you type '50-53'. You can indicate a double jump by typing a dash at the end, e.g. '41-27-', which will move your piece to square 27, and then ask you for the second part of your jump. Note that the starting square for the second jump (27 in this case) must be typed again. You may keep jumping as long as you like by adding dashes to all of your jumps. In the case of a stalemate, or if you get tired of playing, type 'QUIT'. Since Checkers! plays a cautious game, it won't be much of a challenge for good players.

CURVES This program plots pretty patterns on the screen. It draws two types of patterns: hypocycloids and trigonometric loops. "Hypocycloid" is a fancy name for the pattern you get by showing the path of a pencil stuck through a wheel which is rolling within a larger wheel. (The Spirograph$^{(tm)}$ toy draws such patterns.) The trigonometric loops show the points that satisfy the equation $R = F(M * A)$, where R is the radius, A is the angle, M is an arbitrary multiplier, and F is a trignometric function that you choose.

EQUIP Equip helps you maintain a list of equipment with serial numbers, date purchased and cost. (Don't want to keep an equipment inventory, you say? Not to worry! You can change the headings to anything you like.) When EQUIP is run, it asks for the date. Enter the date any way you like, as it is simply stored with your data file to show when the file was last changed. The first thing you need to do is 'Create' a new file. When you select the 'Create' option from the menu, you will be asked for a file name, and a short description of the contents of the file. Next, use the 'Add' option to enter your information. (The only 'required' information about an item is its description. All of the other fields are optional.) EQUIP sorts each item after you add it. Sometimes you'll see it printing dots on the screen while it sorts the item you just entered. It wants to let you know that something is happening! After you enter items, you can list them on the screen or on a printer. (A printer isn't essential, but it is *very* useful!) You can also Change, Delete or Add items. The 'Change' option asks what item you want to change, and then displays that item one field at a time. If you don't want to change a field, press [RETURN]. Otherwise, type the new information for the field. 'Delete' asks you which item to delete, and then displays that item and asks you to verify that indeed you *do* want it deleted.

There are three things you will want to do with EQUIP files: **Create** a brand new file, **Read** an existing 'old' file into the Pet, or **Save** a file on tape or disk. Let's take the case of a new file first. When you run EQUIP, if you are planning to create a new file, use the 'Create' option as the very first thing you do. (Should you forget to do so, and instead Add a lot of data first, don't panic! You can still save the file with the 'Save' option, although the file name will be 'NONE'.) The 'Create' option just sets up a new file, it isn't used to actually write the information on the disk or tape. Note that 'Create' warns you *once* if you try to set up a new file *after* adding data, (instead of before). Please realize that the 'Create' command completely erases any information in the computer, once you successfully give it. The 'Save' option is what actually writes the data tape for EQUIP. Once you 'Save' an EQUIP data file you can 'Quit'. Later, when you want to load that data into the computer, use the 'Read' old data option. There are several checks that prevent you from reading a non-EQUIP file, and you are warned accordingly. If you store data on tape, you should always keep three copies: the current file, the immediately previous copy, and the one prior to that.

The variable FD in line 100 specifies the device to use for files. (Change it to 8 if you have a disk) The variable M1 in line 100 sets a limit on the number of items that your file can hold. For 8K Pets, it is set to only 12! Although EQUIP can be run on an 8K Pet, we don't think that it is practical on such a small machine. However, we went to a lot of trouble so that our 8K Pet subscribers can at least load EQUIP and look at the code. Those of you with more memory should change the value of M1 in line 100 to a limit you select. Before each 'Add' or 'Change', EQUIP checks to see that at least MN bytes of memory are available. If not, it says 'Out of Memory!', and returns you to the menu. This provides some protection against memory overflow, although you can still get in trouble if a 'Change' or 'Add' results in more than about MN/2 net additional characters. You can be as conservative as you like by making MN a larger value. You can change what fields are called, how many fields there are, and where they are displayed on the printer and the screen by modifying the DATA table at line 49500. Each entry has a field name, followed by a number which is the column where that field will be printed. A negative column forces the field to the following line For example the entry **COST,-10** would cause the item "COST" to be displayed on the next line at column 10. (Note that all column positions are relative to the margin required at the left to show the item number.)

OTHER NOTES Once upon a time you could say "POKE 59458,PEEK(59458) OR 32" on certain models of the Pet and speed up the display on the screen. We used it in a few programs and all went well for several months. But after Cursor 19 was shipped we got calls from people with brand new Pets complaining that the program FROG! didn't work correctly. Since we had tested FROG! on both old and new ROMs before it was released, the phone calls were a surprise. We called Commodore, and found out that a 'minor' change in the hardware causes the problem. So, we have ripped that POKE out of FLIGHT! (Cursor 12), JOUST (Cursor 18) and FROG! in Cursor 19. (Poetic justice department: the folks at Commodore were hurt by the change, too: their WORDPRO program also used that POKE.)

A CURSORY GLANCE

We need to understand computers at several levels to be prepared for the enormous change that will happen over the next ten years. At one extreme, it is essential to understand the "big picture" - what changes we can expect to see in society as a result of the proliferation of cheap computing power. At the other extreme, I think that we should try to understand how microelectronics works, down to the level of understanding how integrated circuit chips are designed and fabricated.

Over the last several months, I've read several books that provide some insight into how society may adapt to the computing revolution. If you have time to only read one, I'd suggest that it be Running Wild - The Next Industrial Revolution, by Adam Osborne (Osborne/McGraw-Hill). I especially enjoyed the quick history of our infant industry. Some of the chapters are superficial (the one on computer intelligence is particularly poor), and the book is rather uneven in quality. Regardless, there are many interesting facts and opinions about what we'll see in the near future. The Micro Millennium by Christopher Evans (Viking Press) takes a somewhat more philosophical view of the future than Osborne's book. Evans gives a reasonably good short history of computers, and spends quite a bit of space on the topic of artificial intelligence.

Ted Nelson (the editor of Creative Computing) has written a delightful book called The Home Computer Revolution. (The Distributors, 702 South Michigan, South Bend, IN 46618). His copyright paragraph is easily worth the two bucks: "All rights reserved, including digitization, theatrical readings, glossolalia, locking in underground trunks, littering, or placing this book in, or on top of, any information retrieval system not prohibited by law." Ted is one of the few genuine visionaries in this business, even if his enthusiasm sometimes outdistances fact. Here's another quote to give you the flavor of this excellent little book: "...the convivial hobby that you are part of right now may vanish like the crowd that welcomed Lindberg at Orly. They don't come out to meet the planes any more. Today's summer-camp camaraderie won't last forever, and the computer will probably become a home appliance, as glamorous as a can opener, within a couple of short years."

If you want to really understand integrated circuits, you should read the excellent book Introduction to VLSI Systems, by Carver Mead and Lynn Conway. (Addison Wesley). Make no mistake: the Mead and Conway book is challenging reading, at least for amateurs like myself. But it is clearly written, and presents fascinating details about how chips are designed and fabricated. Basically, integrated circuits will become much denser than they are now before the laws of physics limit further improvements. Denser means faster, and (eventually) cheaper. We ain't seen nothing yet!

CURSOR 21 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)

COVER21	The Cursor Chorus! Graphics by Stephen Pietrowicz.
CAPTURE!	Two wild beasts pursue you, but you can surround them with obstacles (if you are quick, and lucky). By Malcolm Michael.
DANCE!	An animated "Rain Dance" cartoon. By Bob Carr.
BOSWAIN	A computer mystery: where are the rubies, anyway?. By C. T. Nadovitch.
OURANOS!	Warfare with the ultimate weapon: weather! By Kathy Higby.
DRAG	Addition and subtraction drill. By Earl Furnman.

MORE ABOUT THE PROGRAMS

Three of our programs this month use CB2 sound: COVER21!, CAPTURE!, and OURANOS!. If you don't have a sound attachment for your PET, get one! We know of two good sources for sound boxes: CAP Electronics, 8462 Hillwood Lane, Tucson, AZ 85715 (602) 296-4978, and Channel Data, 5960 Mandarin Ave., Goleta, CA 93017 (805) 964-6695. All in all, it's a shame that Commodore didn't see fit to build a little speaker amplifier into the PET. In fact, they still could do so in the PETs they are making now. 1 don't know why they don't: the cost when the machine is first built would be very small. Maybe it's because PETs and CBMs are supposed to now be deadly serious "business machines", and God knows, you'll never hear an IBM mainframe doing something frivolous like this month's CURSOR cover...

CAPTURE!...This is one of those games that will capture your imagination (no pun intended), and may also consume more of your leisure time than you'd care to admit! The game is deceptively simple: first, the screen of the PET is covered with numerous obstacles (shown as reverse video X's). Then, the two beasts that will pursue you appear (shown as *'s), and flash a couple of times so that you'll see where they are. Finally, your marker ('O') is placed on the board. As usual, you use the numeric pad to control your movements. However, nothing happens (except sound) until you begin moving. Once you begin to move, you keep moving, in whatever direction you have indicated with the numeric pad (2=down, 4=left, 6=right, and 8=up. The 1, 3, 7 and 9 keys move you diagonally, and you can stop by pressing 5.)

What makes this game different and especially challenging is that you can push the obstacles in front of you. Which means you can, if you are very clever, trap those nasty wild beasts. Not that it's easy! They are smart little devils, and seem to have a sense of smell or something that lets them track you remarkably well. Should you be so unfortunate as to get too close, they will leap on you and... well - is your life insurance up to date?

DANCE!... Bob Carr author of DROMEDA! (Cursor 18) and FROG! (Cursor 19) has written another delightful PET cartoon. We can't say much more, or we might ruin it for you. Too bad there isn't an Emmy or Oscar for "Best Computer Cartoon Using Character Graphics".

BOSWAIN... Chris Nadovitch (famous to our readers for RATRUN in Cursor 13 and BAT! in Cursor 14) is back again. Sorry, but you'll have to participate in this one before you can appreciate what it's all about. (We won't say anything cute like "Would you care to play another hand".) NOTE: BOSWAIN is rated PG by the Cursor Board of Review, due to its violent tone. (But, by our standards, most of the cartoons on Saturday morning television would get the same rating.)

OURANOS!... This program started out life with the more descriptive name of "Weather War". We couldn't just call it "Weather", since we've already published a weather forecasting program by that name. "War" didn't quite fit, so we did a little research for the name of a mythical figure that is somehow related to weather, and finally chose "Ouranos", the Greek god of the heavens.

The goal of Ouranos! is to destroy your opponent's house using the ultimate weapon: weather. You can select Hail, Lightning, Rain, or a Tornado. Should you tire of the game, select Quit, which will turn sound off in a graceful manner. After selecting your weapon, you must indicate the "charge" that you wish to apply to the weapon. The principle is not hard: negative values go to the left of the screen, and positive values to the right. The maximum values that you can give are from -150 to 150. There are two complications: there is always a wind blowing, which will affect the direction of your weather weapon. The wind factor is clearly indicated on the screen of the PET. The other factor is that from time to time, there is a random "Act of Nature", just like in real life. As the two players attack each other, the devastation caused by the weather weapons shows on the screen as houses gradually disappear from view. The winner is the one who is able to completely destroy the other's house.

DRAG... Provides addition and subtraction drill for little folks. One to four kids can play at one time, with the object being to be first to the finish line with your dragster. Problems are presented, and the time it takes to respond controls how far your car moves across the screen. Wrong answers are corrected, and don't move the car at all. However, any correct answer, no matter how long it takes, will move the car.

We went to quite a bit of trouble to add features so that teachers can customize this program to the needs of individual students. First, line 3110 in the program controls what percentage of the problems will be addition. We have set this initially to 50%. Obviously, if you want all subtraction problems you'll make it 0%, or 100% for strictly addition problems. (Some teachers may want to leave a small fraction of addition problems even when teaching subtraction, just to keep the kids on their toes...).

Controlling difficulty level turned out to be more complicated than you might expect. What we have done is give you complete control of each digit of the problem. (We do limit this program to problems with a maximum of two digits in the addend or augend, or in the minuend or subtrahend.) The DATA table in lines 3000 to 3070 has entries where you may specify the minimum and maximum values you want to use for each digit of the problem. As you get the program, line 3020 has four numbers: 1,9, 2,18. They mean: for the "top row" of any problem, for addition 1 want the smallest value to be 1, and the largest value to be 9. For subtraction problems, I want 2 to be the smallest value, and 18 to be the largest number. Line 3040 contains similiar information for the "second row" of and problem, and line 3070 has minimums and maximums for the answer.

GOSSIP

Commodore is going through another of its periodic convulsions. They have recently shifted to a new system of "regional centers". As part of their Master Plan, they have sharply restricted the flow of information from both Santa Clara and Norristown for whatever reasons. (One well-founded rumor is that folks at Santa Clara have been threatened with being fired if they divulge any information to outsiders.) Commodore recently hired former IBM executive Brent Nelson as the new General Manager for U.S. Sales. That may represent a damn good move, although I'd venture a guess that they ought to be raiding Apple Computer instead! Commodore has had a big problem with WORDPRO III and WORDPRO IV. Basically, for some time it was touch-and-go: the developer of WORDPRO had Commodore over the barrel! We aren't sure exactly how this issue has been resolved.

Other tidbits: the new 8050 disk is about ready to be shipped. It was delayed by problems with the DOS from what we hear. But who knows when we will eventually see the new "cheap" disk. Maybe by Christmas? Pascal, you ask? We don't know yet. However, 8K and 16K PETs are selling very well. In fact,you'll probably find them back-ordered in many parts of the country. Schools are jumping on the PET bandwagon at a remarkable rate. After all, the PET is a superb little machine. Too bad Commodore hasn't figured out how to sell and support the beast properly.

Speaking of nice machines, keep your eye on Radio Shack's new Model III. It appears to be a brilliant redesign of their original Model 1, with just about all of the original mistakes corrected, and several nice new touches added. My prediction is that it will sell like gangbusters. Commodore may well go down in the history of computing as having been first with the best personal computer, but having completely squandered a golden business opportunity.

A CURSORY GLANCE

According to the rumor mill, about the only company in the United States that is <u>not</u> negotiating to take over Commodore is Radio Shack. We have heard "serious" rumors that Motorola, Rockwell, Xerox, and - get this - IBM, have considered purchasing Commodore. In the last six months Commodore stock has gone from $22 to over $100 per share. With all this smoke, where is the fire?

For one thing, Commodore hardware is selling <u>very</u> well. (However, the 8K Pet will probably be dropped in favor of the more profitable 16K and 32K models.) Another factor is the new $295 VIC computer that will replace the small PET. The VIC-20 will attach to your television set and display 22 characters across the screen. The user will have 3.5K of RAM memory, upper and lower case and a large keyboard. There will be color and built-in three-voice sound. VIC cassette tapes will probably <u>not</u> be interchangeable with the PET. VIC Basic will be similar to PET Basic, but not identical.

Who will buy VIC? Well, Commodore hopes to sell a lot of the product in Japan where it is being manufactured. In the U.S., they hope to run away with the low-end computer market. A much bigger question is <u>why</u> will anyone buy such a limited computer? The quick answer is that they won't know any better. That answer is both truthful, and at the same time somewhat unfair. It is truthful when you consider what resources are needed in order to solve significant problems with a computer. You can write useful programs on an 8K PET, but as most of you have found out, it is a real challenge. So what do you do with a 3.5K VIC? It is very simple: either you play a few games with it (probably using ROM cartridges), or you work with it for about a month, and then you go and buy the plug-in 3K memory expander. (What I'm saying is that the VIC is designed as a "Barbie Doll" computer: they will make some money on the doll, but the serious bucks are made selling all those clothes the doll needs!)

The "because they don't know any better" answer is unfair because it ignores the huge demand for personal computers that isn't currently met due to price. While an 8K PET is an excellent value at $795, many folks that would like to have a computer are not willing to spend that much money, at least not that much <u>at once</u>! Commodore will face some tough competition: the new Color TRS-80 from Radio Shack is another nice little "Barbie Doll". (For $399 you get a 4K machine with a poor Basic. For only $119 you can expand the memory to 16K, and for another $99 you get a useable Basic.) Don't forget Atari, either. While the Atari 400 can never sell for $295, it is currently discounted at close to $400. And it is a fine little machine with the most powerful graphics of any of the current low-cost computers.

Quick notes: Commodore will soon announce an 8096 model CBM with 96K of memory. The long awaited 8050 disk is out, and first reports from users are positive. The Pascal programming language for the Pet should be at your dealer by late October.

CURSOR 22 HAS THESE PROGRAMS: (Program names ending with "!" use CB2 sound)

COVER22   The Waves of Change? Graphics by George MacRae.

KALAH   Try to get all of the stones into your Kalah. By Dale Cooper.

POKER   Try your hand against our dealer. By David A. Hook.

MATCH   Remember where the numbers are that add up to your success. By George MacRae.

THUNT!   Find the hidden treasure while evading the robots. By Chris Torkildson.

COMPARE   Compare two Basic programs (on disk) and display the differences on the screen or the printer. By Glen Fisher.

MORE ABOUT THE PROGRAMS

KALAH... This game from Africa has a long and distinguished history. The basic idea is very simple: you and your opponent each try to gather the most stones into your 'Kalah'. Each player has 6 "pits" and 1 "Kalah". The pits are in rows, opposite each other, with the Kalahs at either end. At the start of the game, each pit is filled with a certain number of stones, which you may choose, or let the Pet choose for you. You start the game by choosing a pit, gathering all the stones from that pit, and then dropping them one by one counter-clockwise into your pits, your Kalah, and then your opponent's pits (but never into your opponent's Kalah). The turns alternate between players until all of the pits on one side are empty. At this point, the remaining stones are placed into the remaining player's Kalah, the stones in each Kalah are totaled, and the player with the most stones wins!

There are some interesting twists! For instance, if the last stone you drop lands in your Kalah, then you get an extra turn. Also, if your last stone lands in an empty pit on your side, then the stones in that pit and the pit opposite (on your opponent's side) are all placed in your Kalah. (Watch out, the computer is great at that last one!)

When you play against the Pet, be prepared for a tough game! Remember to try to end your turn on your side, preferably in an empty pit, or in your Kalah. Naturally, the game takes longer to play when you specify more stones for each pit when the game begins. You may want to practice with as few as three stones per pit at first. For a good description of a computerized Kalah, see Chapter 14 of *Etudes for Programmers* by Charles Wetherell (Prentice-Hall, 1968). It is a fun book that is full of useful ideas, and is the best source of intermediate programming assignments you'll find anywhere.

POKER... As you might guess, in this game you play poker against our heartless dealer. You start off with a pot of $1000, and depending upon how much you bet, the stakes are set accordingly. For instance, one pair and you break even, two pair and you triple your bet, etc. As soon as you place your bet, the 'house' (actually, it's your friendly Pet!) takes your money, and returns it only when you win. The house limit is $10,000 per hand, which isn't exactly penny-ante!

MATCH... If you remember how to play concentration, then you'll be in good shape for this game. If you're good with your addition, then you'll be in even better shape, and if you've got an excellent memory, then you're ready for the computer olympics!

A board with 24 squares is displayed, with each square lettered from A to X. Hidden underneath each square is a number. The object of MATCH is to choose a pair of numbers that, when added together will equal the sum chosen by the computer. When a player uncovers such a pair he wins a point and another turn, (and the pair of numbers is removed from the board).

One to four players can play, and the game is over when one of you wins the majority of the points. If you're playing against the PET, you can control how well he remembers where the numbers are, anywhere from random guesses to allowing PET to use his (infallible!) memory.

MATCH can be made simpler for younger players by adjusting the sum chosen by the Pet. Normally, the value chosen for the sum is between 50-99. To change the sum, modify line 270, which normally says:

        270 M=0: TH=INT(RND(1)*50+50)

In the expression (RND(1)*50+50), you might substitute (RND(1)*X+y), where X = (upper limit – lower limit) + 1, and Y = the lower limit. For example, if you want the sum to vary between 15 and 30, change (RND(1)*50+50) to (RND(1)*16+15), where x=16=(30-15)+1 and y=15. Here is one more example: To make the sum vary betweeen 5 and 20, change line 270 to:

        270 M=0: TH=INT(RND(1)*16+5)

THUNT... You are in an underground tunnel system, searching for a hidden treasure. All you have is a hint of where the treasure is in the maze, and you must find it, using the keypad to move about (6 moves right, 4 moves left, 8 moves up, 2 moves down, and 5 leaves you right where you are). You have five seconds to move. To complicate your search, there are vicious robots patrolling the corridors. A good thief must avoid being **seen** as well as being caught. If you find yourself in the same corridor as a robot, you may be spotted, which has the effect of giving the robots an additional move for each of yours.

When you discover a treasure, you have 25 seconds to unscramble a word. If you successfully decode the word, you are given a hint about where the next treasure is. If you cannot decode the word, or if you've found the third treasure, then you are given a hint about where the exit is and you must try to escape immediately!

If you want to make the game more challenging, then start off with more robots, but beware! After you find the first and second treasure, one robot is added, and after the third treasure is found, four more robots are added. Don't despair, though, as you'll receive points for all your efforts, depending upon how diabolical you are. Try for 1000, and if you score less than 200, keep trying; 300 is pretty good, and more than 700, crown jewels – watch out!

If you want to stop playing, simply type a 'Q'. If you want to change the words that your Pet gives you to decode, the word lists are located on DATA statements in lines 1590 to 1620. If you have an 8K Pet, be careful, since the program is very close to memory limits. Each word list in the DATA statements begin with the letter X, followed by a number which indicates the number of words in the list.

COMPARE... NOTE: This program requires the Commodore 2040 disk or equivalent. Compare is the sort of utility program that is only needed every now and then, but when you need it, you really need it! Compare reads two versions of a Basic program, and compares them, line by line. If you have a printer, it will show the differences on the printer, otherwise it will display them on the screen of the Pet.

NOTES FOR

CURSOR™
Programs for PET™ Computers

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A CURSORY GLANCE

Yet another version of Basic is now available from Commodore. And that's not all: there is a new version of the disk operating system too! Since we've only had these new ROMs about two weeks, this will not be an in-depth review. But I will pass along some of our initial reactions.

As I understand things, there are now _three_ flavors of Basic for the PET. (Yes, I know that some of these white boxes with electronics stuffed inside are called CBM's by Commodore. But they are all PETs to me. I'll never understand why they switched names. When is the last time your favorite brand of beer or whiskey or even – yeech – cigarette, changed it's widely recognized brand name?) Back to ROMs: in the beginning God and Chuck Peddle created the PET, with a small assist from Microsoft, who wrote the Basic. Those, my friends, were the so-called OLD ROMs. They had nasty suprises such as the fact that arrays couldn't be bigger than 256 bytes long. When you turned on your white box it smiled and politely announced "*** COMMODORE BASIC ***". (Just so you wouldn't get confused and think that you were using a Radio Shack or some other unspeakable horror.) Well, before long ye olde Commodore started selling what came to be known as NEW ROMS. In their infinite wisdom, they chose to give only a subtle hint as to which version you were using. This was done by having the machine print "### COMMODORE BASIC ###" when you turned it on. These NEW ROMS were a mixed blessing, especially for software vendors that had already published a bunch of programs for the OLD ROMS. The main problem is that Commodore reorganized what 6502 folks call "zero page", which gets used by most machine language programs.

The next thing you know, the 2040 floppy disk was released. Well, Basic and the Commodore operating system didn't know a darn thing about disks, and so interacting with the disk was rather clumsy. What to do? You guessed it: develop yet another set of ROMs with a Basic that knows that "DLOAD" means load a file from the disk, etc. etc.

But, there were some nasty bugs in the original DOS for the floppy, so it also had to be replaced! As you might guess, none of this is free. (Not that I'd expect it to be.) These goodies cost about $125 for Basic 4.0 and another $100 for DOS 2.1.

Well, the newest Basic is called "Version 4.0", and it now tells you the version when the machine is turned-on. (My congratulations to the Chef!) In conjunction with DOS 2.1, you have a much nicer programming environment. (Especially if you have problems with "garbage collection". This happens when you are almost out of memory and are moving strings around. Before version 4.0, your machine would just go to sleep for a few minutes while it repacked memory. This has been fixed.) If you are a TOOLKIT fanatic like me, you'll need to exchange your old Toolkit ROM for the new TK-4.0 version. See your dealer of write the friendly folks at Palo Alto ICs, 430 Sherman Ave., Palo Alto CA 94306. They charge a reasonable fee for the swap. The reference manual for Basic 4.0 is the best yet from Commodore. (I secretly wonder if maybe they had Adam Osborne and crew write it...) But, the manual for the various flavors of floppy drives is wretched! For one thing, they made the mistake of trying to describe both the old DOS and the new DOS in the same book. In their defense I will say that they call it a "Preliminary Issue". Regardless of the poor documentation, the Commodore DOS is the most sophisticated DOS available for any of the mass market computers. I'm not sure how many people take advantage of the power of the DOS, but you have far more control of the system than is possible on – say – a Radio Shack, Apple or Atari.

CURSOR 23 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)	
COVER23	Consider the spider... Graphics by Rob van Gelder
RECIPE	Convert your favorite recipe so you can feed an army. By Nancy Rhodes.
AMBUSH!	Isolate your enemy, and don't get trapped. By Phil Bayman.
ORRERY	The solar system in action on your PET. By Karl and Ernest Marhenke.
ENIGMA	Your very own encryption machine. By Alex Breed.
MWHIZ!	Quick! What's two plus two? By C.T. Nadovich.

MORE ABOUT THE PROGRAMS

RECIPE... This month, some new things are cooking at CURSOR. One of them is called Recipe, and it's for anyone who cooks, whether your specialty is chateau briande or toasted cheese and tomatoes. You'll especially appreciate Recipe if you're cooking for an army, and the recipe serves two, or you're cooking for two and the recipe feeds an army! Recipe will take any recipe and adjust it to make any amount, or to serve any number of people that you specify. All that you need to do is type in your recipe, how much it makes, and how much you'd like it to make. Let Recipe do the rest.

Each ingredient should be entered with the quantity first, expressed as a whole number and a fraction (no decimals), then the unit (ie. cups, tsps, oz.), followed by the ingredient. Each ingredient should be typed on a new line, and when you are through typing in the recipe, hit the RETURN key again.

When the PET asks you how much your recipe makes, type in the amount. For example, you might answer: 5 cups, 3 dozen, 2 (serves two people) etc. When the PET asks you how much you would like the recipe to make, answer in the same way (15 quarts, 1 1/2 dozen, 50, etc.).

If the Pet can't understand a line, it will show you the line and tell you what it thinks is wrong. It will then have you type in the line again. Keep in mind the fact that the Pet makes no attempt to interpret what you type until it tries to do the conversion. Thus, it won't report errors while you're typing. Sigh! Those of you with printers may have the Pet print the converted recipe on the printer, for permanent reference. Those of you without printers will have to lug the Pet to the kitchen. That's all there is to it. Now go try out your favorite recipe (and send us a batch!).

AMBUSH!... A game of strategy in which you, as general, try to outmanuever your opponent, the enemy general. The object of Ambush is to isolate the enemy by destroying the forest around their troops. The two generals take alternate turns, and each turn consists of a move and an attack. The move is made to any of the eight <u>adjacent</u> forests, (provided it has not been destroyed yet), by typing the number of the forest. Bombs are also sent in any of the eight directions, and may travel any distance. Please note that when you move or when you attack that the move or attack must be in a direct straight line from your current position. This simply means that legal moves are: up, down, left, right, and any of the diagonals. You specify your target by typing in the number of the forest you wish to bomb. You may not bomb the opponent directly, but you may destroy an adjacent forest.

Play continues on in this manner until one general is surrounded by forest that has been destroyed and thus can not move. (Unlike the real thing, you can't jump in a helicopter and escape to the pleasures of Saigon at the last minute.) The trick is to not let yourself be cornered (not as easy as it looks!). Good Luck.

ORRERY... (Note for 8K PET users: Orrery can be <u>loaded</u> into an 8K PET, but you'll have to remove the directions (lines 62100 to 62210) before you can <u>run</u> the program!) While the name Orrery might sound a bit cryptic, it actually describes our program precisely. An "orrery" is an animated model of the Sun and planets. Traditionally, an orrery is a mechanical marvel with intricate systems of gears to perfectly simulate the revolutions of the planets. Now, with the advance of technology, your PET becomes an orrery.

Orrery will ask for a year, which must be between 1680 and 2280, and a month, which may be entered as a number or by name. It will then present a view of the Sun and the planets from Mercury through Jupiter as they appear on the first day of the month chosen. Every few seconds, the date is changed and the view is updated.

The letters V,S,A,and W around the edge of the diagram indicate the directions from the Sun to the Vernal Equinox, the Summer Solstice, the Autumnal Equinox, and the Winter Solstice. Once Orrery starts running, you can give it commands to control it. Not all nine planets can be seen at once, since the range of planetary distances is 120:1. Pressing **O** (Oh, not zero) will switch to the "outer" planets (Jupiter on out to Pluto). To switch back again, press **I** for "inner".

The time interval between displays can be changed to 30 days by pressing **M** (for Medium), and to 180 days (better for the Outer planets) by pressing **F** (for Fast). Pressing **S** (Slow) returns you to a 7 day interval. Pressing **R** (Retrograde) will make the Solar System run backwards (such awesome power at your fingertips!). Pressing **D** (Direct) will make it go forward again. To freeze the planets in their current view, type **H** (for Halt). Pressing another key will start them going again. **N** (for New) allows a new date to be entered, and **Q** will end Orrery.

ENIGMA... Enigma allows you to encipher and decipher messages using a system based on the German World War II code machine named (oddly enough) Enigma. It may be a help to anyone who has a 'top-secret' message to send to a friend with a PET, or anyone with some confidential information to save.

At the heart of the machine are five interchangeable 'code wheels', of which three are installed in the machine at any one time. Each wheel can be set at one of twenty-six positions. The chosen wheels and their settings determine the code. You may set the code wheels yourself, or let the PET do it randomly. If you choose to do it yourself, you must tell the PET which three of the five wheels go into the slots, and indicate the settings for each of these three wheels (by the letters A-Z).

Encoding and decoding are done in exactly the same way. Type in the message (be it encoded or not), followed by a blank line. The blank line tells the Pet that it can run the message through the code machine, which it does. As it does this, it prints out the result one letter at a time. If the typed message was encoded, the original message (or 'clear text' as it's callled in the code biz) will appear. If you typed in clear text, the encoding will be printed. (Speaking technically, the cipher that the code machine uses is its own inverse.) One limitation on the encoding process: only letters are encoded; numbers, punctuation, and spaces are thrown away. Since the resulting message must consist of blocks of five letters, there may be meaningless letters attached to the end of your message. For example, if you type in HI and the coded version is SKFIM, and you then type in SKFIM, you may get back something like HIDSO. The extra letters are just to pad the message out to an even group of five letters. (The message is made exactly a multiple of five characters to fool the enemy.)

MWHIZ!... If you enjoy solving arithmetic problem quickly, you'll find this two-person program to be a lot of fun. A problem is presented on the screen, along with a <u>proposed</u> answer. The gimmick is that the answer may or may not be correct for that problem. The two players each have a button to indicate that the answer is correct, as well as one to say that the answer is wrong. Your score depends on two things: did you correctly indicate whether the answer was correct or not, and how fast did you do so. If you are <u>right</u>, your total score goes **up**. But if you are <u>wrong</u> - well, your score goes **down**. If you are right and you answer very quickly, you might get as much as 13 points. The longer is takes you to answer, the less you get. For example, if you answer within 2.4 seconds you get 5 points. (But you'll never receive less that one point!). You are allowed about ten seconds to answer, at which point the machine tells you what the answer was, and neither players score is affected.

In line 190 there is a DATA statement that can be modified so that the relative frequency of addition, subtraction, multiplication and division can be specified. On your Cursor tape, the four numbers are all "1". But to change the program so that it only presents addition problems, you would change line 190 to: 190 DATA 1,0,0,0. Other modifications you may want to make are to change the highest possible score for an answer, which is controlled by the equation in line 110. Change the number "12" in that line to the maximum score minus one that you want to get for a very fast answer. If you'd like the game to end at, say, 100 points (instead of 50), change line 100 so that MP=100.

A CURSORY GLANCE

Commodore introduced the new VIC computer at the Winter Consumer Electronics Show in Las Vegas. One of the more interesting things about the Commodore booth was that the VIC was the only thing on display! (Well, there was one rather lonely looking CBM/PET system over in the corner of the booth but nobody was paying much attention to it.) The other remarkable fact about the Commodore exhibit was that all the faces were new since the show one year ago. As you've probably heard, Commodore has had massive changes in its staff during the last year, including several general managers, turnover in the regional offices and a mass exodus of a number of key technical people. However, there has recently been a major reorganization at the top level. Just a few days before CES, word leaked out that Jack Tramiel had been promoted to Vice-Chairman, and that James Finke from Data General would replace him as President. The high turnover of talented people at Commodore clearly indicates that a change in management was necessary. Let's hope that the new team will finally get serious about providing adequate support for users and dealers of the fine Commodore product. Shoot, I'd settle for a twelve month moratorium on the introduction of new, incompatible versions of the Basic ROMs...

The VIC is an exciting, well designed little machine. And it is a pretty machine. The packaging is as nice as anything I've seen from IBM or HP! But it is a "Barbie Doll" computer. I think that VIC was designed to sell at a very low initial price (under $300), with the certainty that the majority of purchasers would soon discover that they need – (pick one or more items) – more user memory; more than 22 characters displayed on each line; high-resolution graphics; an RS-232 interface; IEEE-488, and on and on.

Another factor that may have affected VIC design decisions is that Commodore wanted to use chips manufactured in-house by MOS Technology. Since MOS doesn't make "dynamic RAM" memory chips, the VIC uses "static RAMs", which draw quite a bit of current (and therefore generate more heat) compared with dynamic RAMs. Since the VIC uses a small external power transformer, which can only put out so much current, and the VIC enclosure can only tolerate so much heat, it is reasonable to conclude that the rather modest amount of memory in the VIC was chosen for these valid technical reasons rather than due to any crafty marketing strategy.

VIC Basic is very similar to the standard PET basic, with several new capabilities such as three-voice sound, a "noise" register and color. (The way that you control color with the VIC is simple and easy: the number keys 0 through 9 each control a specific color when used with the control key. I think that for the novice this is an easier way to control color than on the Apple and Atari.) It also has screen editing, (which is not available on any machine Radio Shack makes!), and is theoretically expandable to 32K of memory. And the VIC has a real keyboard! (Which is ironic, since the original PET lost a lot of sales to Radio Shack because of its "funny" keyboard. My hunch is that the VIC will sell very well. Commodore claims they will sell 100,000 by Christmas. We'll see.

OTHER NOTES: You might want to send a self-addressed envelope with two stamps to: Central Illinois PET Users, c/o Jim Strasma, 3838 Benton Dr., Decatur, IL 62526. Jim is publishing an informal newsletter called The Midnite Software Gazzette which has brief reviews of PET programs. An excellent source of PET information is COMPUTE, Box 5406, Greensboro, NC 27403, phone: (919) 275-9809. They are great people who put out a fine product.

CURSOR 24 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)	
COVER24	A profusion of patterns... Graphics by Mark Stewart.
DEFEND!	Fight off invaders from four directions. By Randall Lockwood.
G-WORD	Guess the secret word with a little help from your PET. By James Wildermuth.
RACER!	How fast can you ride and avoid the side? By Mike Rawley.
PRINTSIT	Create pictures on the screen and save them on paper. By Brian Sawyer.
RE-NUM	Renumber your entire disk file, or just a portion of it. By Gary Huckell.

"Computers' use of symbols, like the use of symbols in language and mathematics, is sufficiently disconnected from the real world to enable them to create splendid nonsense." - Alan C. Kay

MORE ABOUT THE PROGRAMS

Two programs in this issue use CB2 sound: DEFEND! and RACER!. If you don't have a sound attachment for your PET, get one! We know of two good sources for sound boxes: CAP Electronics, 8462 Hillwood Lane, Tucson, AZ 85715 (602) 296-4978, and Channel Data, 5960 Mandarin Ave., Goleta, CA 93117 (805) 964-6695.

DEFEND!... The enemy is attacking your star base from all directions and it's your job to defend it. You have four laser guns to help you, but if you're not quick enough to react, the enemy missiles will penetrate your defenses and batter the walls of your station. Although your star base is strong, it can only withstand four assaults.

The laser guns operate on a restricted amount of energy (depending on your skill level), and when you miss you drain your power. Use the number pad to fire at the oncoming missile (4-left, 6-right, 8-up and 2-down). If you score over 2500 points, your base is strengthened to withstand another bombardment. At the higher difficulty levels you'll notice that the enemy sometimes fires from close range!

G-WORD... The PET has a secret word which you are trying to discover in as few guesses as possible, with the help of the PET's reluctant hints. After each guess, the PET will tell you how many letters are correct - but not which ones.

To help you keep track of your work, an alphabet is shown on the screen from which you can highlight and delete letters. After each guess, an arrow will point to the alphabet and you can move to the letter you wish to modify. There are several ways to travel. You may press a letter, and the arrow will jump to that letter, or you may move the arrow yourself with the number pad (6-right; 4-left) or with the cursor controls. Once you are at a letter, you may delete it if you think it is not used (DEL or SPACE), insert it if you change your mind (INST), highlight it if you think it is in the secret word (RVS), or un-highlight it if you find that it isn't (shift RVS). RETURN takes you out of "edit" and lets you try another guess. Each guess will be saved on the screen for your reference. You can go back to the alphabet instead of making a guess by pressing [↑] (the up-arrow key). Note that G-WORD pays no attention to the alphabet. If you don't want to use it at all, that's okay too. (But we think that it is quite handy.)

You are given twenty guesses, but if you find that you need more, then change the GUESSLIMIT variable on line 100 to whatever you want. If you want to give up, just hit [RETURN] instead of guessing a word. One more word of advice: the secret word is five letters long, and no letter is used more than once.

RACER!... Racer! is a motorcycle race in which you control the speed and direction of your motorcycle. The object is to complete the course as quickly as you can, or to be more precise, as quickly as you dare, because if you crash, the race is over. To add to your problems, some courses aren't well maintained and have potholes here and there.

To prevent a collision, you must not only stay on the right track, but avoid the potholes as well. You steer your motorcycle by moving left [4] or right [6]. If you turn one direction you will continue on the new path until you straighten yourself out by turning the opposite way. Speed is also controlled on the number pad; [8] to slow down and [2] to speed up.

Racer! can be played on all levels of difficulty by specifying the track width and the condition of the surface (number of potholes). With a wide track and only a few potholes, the game is extremely simple, whereas a narrow course with a lot of holes can be almost impossible. Start out cautiously and increase the difficulty in proportion to your confidence, and don't forget your helmet!

PRINTSIT... This program allows you to easily create pictures on the screen and then print them on your Commodore printer. The program puts exactly what is on the screen onto paper. Since we think that you'll usually want to draw with the PET's graphic characters, PRINTSIT automatically shifts your keyboard into graphics mode. To draw your picture, press the desired character, and then press the direction on the number pad that you wish to move [8=up, 2=down, 4=left, 6=right, and 1,3,7 and 9 diagonal] and that character will be printed for as long as the key is pressed. Since PRINTSIT has a small set of "commands" (such as Q for Quit, 8 to move up, etc.), you also need a way to tell it "I want to print the next character instead of treating it as a command". You do so by pressing the "C" key ("C" for "Character"), then the key you want to print. So, to print the number "8", you press: "C", then a shifted "8". (Remember, you get all the graphics without shifting the keys.) The "command" keys that require this special treatment are: the numbers 1-9, "Q" (for "Quit"), and, quite naturally, "C" itself!

To clear the screen, press [CLEAR] twice (to protect you against accidentally clearing the screen). You can draw the image in reverse by hitting the [RVS] key, and [shift RVS] gets you back to normal. To move the cursor to another spot without changing the picture, simply press [DEL] or [RETURN] before moving. When you're done creating your design on the screen, press [INST] twice. (As with [CLEAR], this helps prevent accidental screen dumps.) The screen contents will then be copied to your Commodore printer.

PRINTSIT uses a Basic subroutine (lines 59000-59150) that prints the entire screen contents onto the printer. This subroutine can be merged with other programs using the MERGE program in Cursor 17. You can also use the APPEND command in the Programmer's Toolkit from Palo Alto ICs. (But be careful about conflicting line numbers.) It can also be typed into your program. You'll need to un-comment line 59000, and change WD=40 to WD=80 if you are using the subroutine with an 80-column PET. Once the subroutine is in your program, you can copy the screen to the printer by saying GOSUB 59000.

RE-NUM... RE-NUM allows you to renumber just a few lines of a Basic program, or the whole thing. It requires the use of either the 2040 or 4040 Commodore disk unit. It is very easy to use: answer the questions that it asks, and then let it do its work. You can specify beginning and ending line numbers, what new line number you want to start at, the increment to be added to each line, the name of the file to renumber, and the name of the new, renumbered file. It complains when it finds references to lines that don't exist. (You can have the complaints on paper if you tell it to put the on your printer.) We have found the program to be very useful in our work, since we are pretty fussy about certain standard routines always being numbered with standard line numbers.

A CURSORY GLANCE

Question: what is common to calculators, cameras, televisions and automobiles? Answer: products made in Japan dominate the market. And soon we'll be able to add "personal computers" to that list! At the recent West Coast Computer Faire in San Francisco, the new wave of computers from Japan was very apparent. The one that will have the most immediate effect will be the excellent machine from NEC called the PC-8001A. It was first shown at NCC last year, but hasn't really been available in the US until recently. We hear that the NEC computer is currently the best selling small computer in Japan. It uses the Z80 processor, and will be able to run the CP/M operating system. (In case you didn't know, "CP/M" is a registered trademark of Digital Research. And their lawyers won't let you forget it for one moment, either!) While I have not been able to use the NEC yet, people that I respect tell me that it is a fine little machine.

An interesting computer from Sharp called the MZ-80B was also shown. Suprise: like the NEC, it also uses the Z80. It has a 9-inch green CRT monitor that appears to have very high resolution. Like the original PET, the Sharp has a built-in cassette tape recorder. There are ten function keys that can be defined by the user. (Function keys are very handy. They are not expensive, either. I don't know why more machines don't provide them.)

Hitachi was showing their MB-6890 personal computer. (It uses the Motorola 6809 processor chip, the same one that Radio Shack uses in their little color computer. Rumor has it that Motorola did almost all the design of the Radio Shack color computer and then gave the design to Radio Shack, just to be able to sell all those chips.) The Hitachi has 640 by 200 dot high resolution graphics, and 25 lines of 80 characters. It is packaged very attractively, as are the NEC and Sharp.

The Commodore VIC-20 was also displayed at the Faire, but without much hoopla. The Commodore Computer store was taking orders for the VIC, but were not very specific about delivery dates. I think that the VIC will face extremely fierce competition. Although VIC is priced low, ($300 without a tape recorder or programmer's manual), there is another machine that's even cheaper: the Sinclair ZX-80. The ZX-80 is not nearly as nice a machine as the VIC, but it is currently selling for $200, and the revised ZX-81 will be available later this year for close to $100. That's right folks: a $100 computer! Sinclair has followed the calculator approach by replacing about 15 individual IC chips with a single, custom integrated circuit.

Commodore enthusiasts argue that since the VIC is so much better than the ZX-80 the extra $100 to $200 premium in price won't affect the decision to purchase. I wonder. Both machines are targeted squarely at that segment of the market that doesn't know how to spell "computer", much less evaluate the importance of having 3.5K or memory versus 1K, or a real keyboard versus a plastic sheet with letters and numbers printed on it. Besides, if you are buying a first computer, maybe it's best to buy a genuine throw-away, rather than a machine that, while expandable, quickly becomes a tangle of extender cards, wires and widgets. People don't generally "upgrade" their $12.95 four-function calculator into a full-fledged scientific or financial calculator. Instead, they purchase another calculator that has the features they need, and give the four-banger to their kids, or throw it in the bottom drawer. Another argument is "How much computer do you need, if all you want to do is learn a little bit about computing?". Not very much. And the ZX-80 or ZX-81 fills the bill quite nicely, thank you.

Do I personally like the ZX-80? Not at all. I would not choose to use one myself. But there is a huge market for such a machine, because it is so inexpensive. I think that the VIC may be too expensive for the "first computer" buyer, and not have enough power for the person who is actually going to use the computer to for "useful" applications. And I suspect that the Japanese will attack it agressively from the "Sinclair ZX-80 el cheapo, disposable" end as well as the "PET, TRS-80, Apple, Atari full-function (but fairly inexpensive)" end. It will be fun to watch the battle. I have a feeling that there will be blood all over the floor before we'll know who won.

CURSOR 25 HAS THESE PROGRAMS: (Program names ending with '!' use CB2 sound)

COVER25   Try to trap all the gas molecules. Graphics by K.L. Carpenter.

MAXIT   Can you maximize your score in this logic game? By Harry J. Saal.

MAIL   An easy-to-use mail list utility. By Roby Hyde and Hunter Hancock.

RESCUE!   Fly your own space shuttle and rescue survivors. By Nick Jackiw.

REPAIR   Maintain an inventory of equipment to repair. By Kim Lantz.

XREF   Cross-reference your PET Basic programs. By Jim Butterfield.

MORE ABOUT THE PROGRAMS

MAXIT!... is played on an 8 x 8 board, like chess. Each game starts off with a new board, introducing a new variation each time. You can play MAXIT! with the PET if you like (it's tough to beat!), or with another person. Each of the 64 squares starts off with a number in it, ranging from 15 down to -9, except for one square which shows a special marker made of two asterisks. Each player tries to win as many points as possible by the end of the game. By moving the marker to a square which still shows a point value, you earn that many points (or lose that many!).

The first player can move the marker only in a horizontal direction, and the second player can move only vertically. As usual, you move using the numeric keypad. The first player uses [4] (left) and [6] (right) to move to his desired square, and the second player uses [2] (down) and [8] (up). Once you have decided upon the place you want to move to (and thus win that number of points), press [RETURN] and the special marker will jump there, and those points will be added to your score.

MAIL.... Requires 16K memory. Keeping a mailing list for a small organization is a good task for the computer. (MAIL is so friendly that you don't need many directions! One thing, however: remove your CURSOR tape after you Load MAIL. Since it writes data files, we don't want you to "wipe-out" the rest of the tape!) MAIL makes it easy to enter names and addresses, sort by name or postal code, and then print labels on standard (3 1/2 inch wide by 15/16 inch high one-across pin-feed) labels. When you enter or modify data, you are able to use the full screen editing available on the PET, including insert and delete and cursor movements. If you botch things up, press the [OFF] (shifted reverse) key. When you are ready to go on to the next name and address, press [SHIFT], hold it down, and press [RETURN]. Beware of the [STOP] key... Should you accidentally hit it, move the cursor to a blank line on the screen and type "CONT". MAIL can store files on either disk or tape, by changing the variable FD in line 100.

RESCUE!... One of the ships in your space fleet has crashed on an alien planet, and you must rescue its survivors from the (very unfriendly) inhabitants. Your mother ship cannot land on the uneven terrain, so you must ferry the survivors back to the ship in your shuttle. This means landing the shuttle safely on the landing pad, picking up a survivor, and carrying him back to the mothership. Survivors can only be carried one at a time and they're found in groups of five. The more survivors you rescue, the harder the aliens make it for you to complete your mission.

There are three levels of difficulty: Easy, Average and Hard. At the "easy" level, you start off with five shuttles, and the aliens have one row of orbiting attack craft. Whenever you are able to rescue an entire group of five survivors, you get a bonus. The aliens keep adding rows of attackers (up to the maximum of three). And that's not all! They fire laser weapons that produce permanent "space flak", which you must dodge unless you want to crash.

When you select "average", you get three shuttles, and the enemy starts off with two rows of attackers. The most difficult level gives you only one shuttle, and the aliens begin with three rows of attack craft. There's one more little wrinkle: after you are able to rescue a group of five when the enemy has three rows of attackers, they reduce the size of your landing pad!

Press any key to launch your shuttle from the mother ship. You control the shuttle with the numeric pad: left is [4], and right is [6]. Once you land, press [8] to launch your ship again. Pressing [5] lets you "hover", but it uses lots of energy. Points are scored for each person you save, and as the missions get harder the survivors are worth more points.

REPAIR... Requires 16K of memory. This program maintains a record of the status of customer orders (units waiting for repair, parts, back orders, etc.) in your shop. (It was submitted to us by the owner of a television repair shop who uses it to keep track of TV sets that are awaiting repairs. He has found this to be a very useful application for his Pet.)

After you have loaded the program, type RUN and the screen will display the various options. Basically, you can add (or modify) data, and then save it on either tape or disk. You can also have the PET search your data for a specific name or tag number. The variable FD in line 100 controls the device number that REPAIR uses for data files. (1=cassette 1, 2=cassette 2, and 8=the 2040 or 4040 floppy disk)

XREF... Requires 4040 disk. If you write Basic programs that are longer than about 50 lines, XREF may be one of the most useful programs you'll ever find! XREF provides you with a complete list of all variable and line number references in your program. A limitation to remember: if you use the spelling "GO TO" (instead of "GOTO") XREF won't report that line number reference.

THE TOO-MANY VERSIONS OF BASIC AND DOS BLUES We do all of our major PET program development using Basic version 4.0 and DOS 2.1. Consider how many other flavors there are: Old ROMs, New ROMs Old DOS, the 8050 disk, the business keyboard, the 80 column version of Basic 4.0. We have tried valiantly to make all our programs work on every variety of PET, without user intervention. But from this issue forward, we are going to change our emphasis somewhat. Specifically, Basic 4.0 has been awarded "most favored nation" status. In plain English that means that we will do minimal testing of our programs on Old and New ROMs, and will only test disk programs with the current release (DOS 2.1 at this writing). Since there are probably more 16K Pets than any other size, we are also going to accept and publish more 16K programs. (However, please rest assured that it will be a cold day in Hell before we publish a strictly 16K issue.)

"The pumpkin, as a shade tree,
is largely a failure."
Mark Twain

A CURSORY GLANCE

Xerox, IBM, and Digital Equipment Corporation (better known as DEC). What do these "big guys" know that has escaped the attention of the product planners at Commodore? Before you spend much effort on this puzzle, here are some hints: over 200,000 current installations; supports many excellent application software packages; available on computers from many different manufacturers; solid and reliable; considered by many to be the industry standard.

If you guessed the CP/M operating system from Digital Research, you go to the head of the class. CP/M is not the world's finest disk operating system, by a long shot. So why did a company like Xerox choose CP/M as the operating system for its newly announced Xerox 820 "Information Processor"? I think it was an obvious choice. Computer hardware needs software in order to do anything. People who buy computers expect good word processing software (such as Wordstar or Magic Wand) to be available. They also seem to want to be able to select from a variety of well-supported accounting packages that are used at many different sites. Even the "big guys" have realized that they can not possibly provide all of the applications software that their users will want. And software sells systems.

As you probably know, Xerox employs some of the best computer scientists in the world. People such as Dr. Alan Kay who developed the exciting Smalltalk language, and who is working on the "Dynabook", a computer with very high resolution graphics that will be the size of a large textbook. And recently, Xerox began selling one of the nicest computers currently available, the Xerox Star. It sells for about $16,000 and does just about everything except brush your teeth. Xerox most certainly could have designed their very own operating system for the new 820, but instead they choose good old CP/M. (They have put their own menu-driven "front end" between you and CP/M. I haven't seen it work, but it sound like it's a lot friendlier than standard CP/M.) Maybe Xerox understood the importance of all that CP/M applications software that is available now.

DEC will also bring out a personal computer later this year that will use CP/M. Like Xerox, DEC has the resources to develop operating systems. My hunch is that they picked CP/M strictly because it has become an industry-wide standard. And although IBM's new little computer (available this summer?) won't have "vanilla" CP/M, supposedly it will have a very similar operating system written by Microsoft. And then there are all those new Japanese computers that we'll be seeing in the next year or so. From what I hear, most of them will run CP/M.

The picture seems pretty clear: in a few years, I think we will see two standard operating systems on small computers. CP/M will continue to dominate the low end. And UNIX (a trademark of Western Electric) will become the high-end operating system on 16-bit and 32-bit personal computers. Commodore, are you listening?

VIC VS. ATARI

The Atari 400 has been reduced in price to $399. (The Basic cartridge - which is now an option - costs another $65). The 400 has 16K of RAM memory and the sophisticated "player missle" graphics such as those used in the "Star Raiders" game. We've heard a rumor that VIC may cost $330 when the FCC approved version comes out later this summer. ($299 for the computer, plus another $30 for the cable and RF modulator that you need to connect it to your TV.) The in-house programming expertise that Atari has developed is awesome. Whether Commodore will ever be able to match Atari in the "cartridge wars" is an open question. Even so, I expect the VIC to sell very well, once it is available in quantity.

--- **CURSOR 26 HAS THESE PROGRAMS:** ---

COVER26   A PET volcano explodes on your screen. By Brian Sawyer.

LAWN!   Can you mow the lawn before you run out of fuel? By Kathy Higby.

TANK!   A two-person shoot-em-up. By Mike Rowley and Shawn Meehan.

RAM   Who can get across first? A two-person board game by Hal Carey.

SAFE!   Can you find the combination before the police find you? By Gary Marsa.

TEST   Calculates statistics for a set of test scores. (Needs 16K) By Gary Marsa.

(Program names ending with '!' use CB2 sound)

MORE ABOUT THE PROGRAMS

Three programs in this issue use CB2 sound: LAWN!, TANK!, and SAFE!. If you don't have a sound attachment for your PET, get one! Sources for sound boxes are CAP Electronics, 8462 Hillwood Lane, Tucson, AZ 85715, and Channel Data, 4141 State St., Suite A2, Santa Barbara, CA 93110.

We use the PET's numeric pad to indicate direction of movement in many CURSOR programs. Press [4] to move left, [6] to move right, [2] to move down, and [8] to move up. If diagonal movement is allowed, then it is controlled by pressing [9] for up-right, [7] for up-left, [1] for down-left, and [3] for down-right.

LAWN!.. Who would have thought that cutting the lawn could ever be so much fun? In this game you have a pleasant suburban yard which you must cut before the fuel in your self-propelled lawnmower runs out. You guide the lawnmower over the grass using the numeric pad in the usual manner, and try to cut as much of the lawn as you can. Except for those hidden patches of weeds and rocks, that's all there is too it. LAWN! has super sound effects...

TANK!.. In this two-person game you try to destroy your opponent's tank before he destroys yours! Each player begins with three tanks. Depending on the skill level, each tank has from six to twelve rounds of ammunition, and from zero to three mines. When you exhaust your ammunition, your tank is considered destroyed. The battlefield is strewn with bushes that provide cover from attack by your opponent (but are also obstacles to firing your gun). The first player to destroy all three of the opponent's tanks is the winner!

The player on the right uses the numeric pad in the standard fashion to move his tank. Press the [5] key to fire shots at your opponent. Press the zero key [0] to lay a mine at a given location.

The player on the left uses the leftmost nine keys on the keyboard, in a manner similar to the numeric pad. Press [W] to move up, [X] to move down, [A] to move left and [D] to move right. Press the [S] key to fire, and the [RVS] to lay a mine.

RAM.. A two-person board game for strategic thinkers. (Being sneaky doesn't hurt either.) The object of RAM is to make a "crossing", i.e. move one or more of your pieces completely across the board. The first player to make a crossing that is not immediately countered by an enemy crossing is the winner. You may move a single piece, or a group of pieces. When you move, you can move as many spaces as there are members in the group. For example, if there are two pieces in the group, you may move either one or two spaces. You may move in a straight line in any direction, including diagonally.

When your group 'rams' into an enemy piece, you capture that piece, and he disappears from the board. You cannot capture a piece if he is a member of an enemy group of the same size or larger than the group that you are 'ramming' with. A capture uses up all of the forward momentum your group may have had, so only one piece can be captured per turn.

To move, position the cursor on the lead piece of the group that you want to move, and hit [RETURN]. Next, move the cursor to the place where you want the "head" of the group to move to, and hit [RETURN] again. However, if you only want to move a portion of the group, then after marking the head of the group, move the cursor onto the tail of the group, hit [RETURN], and then proceed to show where you want your group to move. (If you do not indicate the tail of the group, then the PET will assume that you want to move the entire group).

If at any time in your move you make a mistake and want to start your move over, hit a shifted [CLR] and you may start again. When the PET is confused by your commands, you will get an error message, and must start your turn again. To learn more about this clever game, see pages 46-52 of the excellent book A Gamut of Games by Sid Sackson, Random House, Inc. (1969)

SAFE!.. You have between one and two minutes to open a safe with a combination lock. There are four numbers in the combination, alternating right, left, right, and then left again. The numbers on the dial appear in a window on the safe door. Turn the dial to the right by pressing [6] and to the left by pressing [4]. As the numbers turn, you will hear a click. When you hear a double click, then you know that you've found the next number of the combination, and you can start turning the other direction. There is a number to the right of the combination dial that tells you how many correct numbers you have found so far (especially useful if you don't have sound!). If you pass one of the numbers, then you must start from the first number again, so try to remember the correct numbers as you find them.

When (or if) you discover all four numbers of the combination, press [RETURN] to open the safe, and discover what is hidden inside. If you are too slow and the police catch you... (Well, you'll certainly know when it happens.)

TEST.. (Requires 16K memory) TEST is an aid for teachers in grading tests. It accepts scores as DATA statements, and calculates the arithmetic mean, the median and the sample standard deviation (using N-1). You can print (on the screen or printer) the sorted scores with percentiles, the grading scale and score statistics. In addition, TEST presents the scores on a bar graph on either the screen or the printer.

When the program begins, you are asked for the maximum possible score on the test. It then reads your data, counting the number of results that you entered. Next, it sorts the test scores (which can take a while), calculates the statistics and sets up the graphing information. You are then shown a menu of the options you have for displaying the data.

When you display the test statistics, it will show two sets of grading criteria. The one on the left of the screen uses fixed percentages to determine grades, (90%=A, 80%=B, etc.). You may change these percentages by modifying line 9000 of the program. On the right of the screen is a second box that displays grades based on "the curve". TEST uses mean + 1.5 standard deviations (std. dev.) as the cutoff for an A, mean + 0.5 std. dev. for a B, the mean for a C, mean - 0.5 std. dev. for a D, etc. If you choose to do so, you can have this curve recalculated, at which time scores greater than 2.5 standard deviations are ignored. You may even have it calculated a third time, with scores outside two standard deviations from the mean ignored.

> *"If a system is to serve the creative spirit, it must be comprehensible to a single individual."*
> **Daniel H. H. Ingalls**

A CURSORY GLANCE

During the summer of 1981, Xerox has introduced its Model 820 (a Z80 CP/M machine), Hewlett Packard has announced the HP-125 (another Z80-based CP/M computer), and Data General brought out the 16-bit Enterprise system, which uses the Nova instruction set and a non-CP/M operating system. And IBM announced what it is calling The Personal Computer. (Ah, such modesty.)

The Xerox 820 and HP-125 machines compete directly with the Radio Shack Model II and the Apple III. The Commodore 8032 is cheaper, but has 32K maximum memory and does not support CP/M. However, there will soon be a couple of CP/M boxes (for about $1000) that can be hung off the Commodore bus, and that basically use the 8032 as a smart terminal.

IBM's new computer uses an Intel 8088 16-bit processor, which is much faster than the 6502 used by Apple and Commodore, or the Z80 that almost everybody else uses. Even more important, the IBM allows the user to have up to 256K of RAM, four times the amount available on todays Z80 systems. There is a real sleeper, too: Intel has an extremely fast floating point math chip called the 8087 which works in concert with the 8088. The IBM already has a socket for the 8087! When the 8087 is released early next year, all you'll have to do is plug in an 8087, (and buy a compiler that takes advantage of its features) to experience a significant speedup in programs that do lots of math.

IBM is using an expanded Microsoft Basic (with 40 character meaningful variable names and error trapping). The DOS and Pascal are also from Microsoft, and the Easywriter word processing package and three accounting programs are all non-IBM products. IBM has contracted with Digital Research for a version of CP/M-86 that will work on the Personal computer. CP/M has recently made a "sweep" of the small computer industry. Wang is offering it, Xerox will have it for the powerful 860 word processor, and almost all other word processing systems will soon offer it. Apple, Commodore, Atari and Radio Shack are the hold-outs. We even hear that Radio Shack will soon offer CP/M, instead of making you buy it from independent vendors.

The keyboard and display will be one of the best features of the new IBM. The best keyboards I've ever used were all made by IBM: the Selectric typewriter, and IBM terminals. Somehow, nobody else does it quite as well. When you stop and think how much time you spend at a keyboard, as well as looking at the display, you realize how crucial these "small" items are.

A most interesting rumor: the famous University of Waterloo software that was announced for the new Commodore 6502/6809 "Super PET" may appear very soon on the IBM personal computer. All that is needed is to rewrite the intermediate code interpreter for the 8088. Hmmm...

So what's going to happen to Commodore, Apple and Tandy? Well, I think Commodore's best hope is that the VIC will sell like hot cakes. (I think it will: we have developed a new software product — **VIXEL** — specifically for the VIC.) Commodore's CBM product line will probably be hurt somewhat by the IBM and Xerox machines, but Apple will be severely hurt by the new machines. The Apple III has been somthing between a disgrace and an embarrassment for Apple. We continue to hear rumors that Apple will drop the Apple III in favor of a much more powerful Apple IV that will use the Motorola 68000 chip. Apple is also sustaining heavy competition from Atari. The Apple II was never a particularly great machine, it just happened to be promoted very effectively. But the Atari 800 is about $300 cheaper, and has several important technical advantages. Radio Shack will probably be hurt the least by IBM, HP and Xerox: those 7,000 retail stores are an important advantage. Also, you can expect to see a new 16-bit machine from them soon. and they already have an 8-megabyte Winchester hard disk as an option on the Model II.

Early in this century, there were over fifty companies that designed, manufactured and sold automobiles in the United States. Today there are four. One of these days we are going to start seeing fewer, rather than more microcomputer manufacturers. Stay tuned.

CURSOR 27 HAS THESE PROGRAMS:

COVER27 Music on the screen of your PET. By Steve Gull.

ATTACK! Protect your treasure from the enemy. By Parry Gripp. Edited by Mike Rowley and Andy Stadler.

EMAZE! Find your way through a fast-changing electronic maze. By Teece Jurgensen

DUEL! Two-person strategy board game. By Jurgen Schroder.

MISER Can you find all the treasure while you explore all the rooms? (Needs 16k) By Mary Jean Winter. Edited by Andy Stadler.

PROCHAR Design programmable characters for the Commodore 2022 printer. By Steve Gull. Edited by Mike Rowley.

(Program names ending with '!' use CB2 sound)
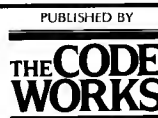
MORE ABOUT THE PROGRAMS

We use the PET's numeric pad to indicate direction of movement in many CURSOR programs. Press [4] to move left, [6] to move right, [2] to move down, and [8] to move up. If diagonal movement is allowed, then it is controlled by pressing [9] for up-right, [7] for up-left, [1] for down-left, and [3] for down-right.

ATTACK! You are the sole defender of a treasure that is located inside the walls of a castle. Wave after wave of attackers try to capture the treasure, which is protected by a sophisticated alarm system. The treasure is so valuable that the alarm system destroys the treasure after three attackers have violated the security of the inner vault. Use the numeric pad to move, but note that you have to hold the key down in order to move. You can fire your weapon by holding the [SHIFT] key down and pressing the number key for the direction you wish to fire. The attackers have only one goal: to reach the treasure that you are trying to protect. They attempt to break down the walls around the castle so that it will be easier for the next wave to capture the treasure. But you can rebuild partially damaged walls, _if_ you have time! Walls may be rebuilt by moving directly into a weak spot. (However, once the attackers have successfully made a hole completely through the wall you are no longer able to rebuild that spot in the wall.)

Should an attacker come directly face to face with you, he sacrifices himself, knowing full well that his heroic act will be avenged by _two_ new warriors that will rush into battle. And just when you have succeeded in eliminating one wave of attackers, there is a brief respite (rebuild those walls!) and then yet another wave attacks your castle.

Although ATTACK! has three skill levels, we find that beginners are still challenged by the easiest level. A few hints from an old warrior: use both hands. Use your left hand to control the [SHIFT] key, since it's very important to be able to fire quickly. You'll probably want to use at least two fingers of your right hand to move, or, with the [SHIFT] key pressed, to fire at the enemy. Remember that the corners of your castle are vulnerable. You'll want to quickly move outside of the castle and eliminate as many attackers as possible. But when even one of them gets close to a corner, go back inside and fight them hand-to-hand.

EMAZE! The concept is simple: you are in a fast-changing electronic maze, and must find your way to the exit (which is at the lower right corner of the screen). Naturally, you use the numeric pad to move. Just as you start to make some progress, the whole world changes! There's a time limit, and if you don't make the exit within that time, well, you lose. As the game begins, you'll be asked if you want the "bounce option". When you are a beginner, the answer should be "No", since the bounce option makes the game much harder.

DUEL! This is a two-person dice game that is played on a board. When it is your turn, tell the PET which piece to move. The number on the top of that piece indicates the number of space that you may move. You indicate the direction of movement in the normal way, using the numeric pad, with 8 moving up, 2 down, etc. There is one restriction: in a given turn, you may only change direction _one_ time. When you complete moving a piece, you can accept the move by pressing [RETURN]. Or, you may start over (even choosing a different piece) by pressing [SPACE]. You capture pieces by moving on top of them as the _last_ move in a sequence. For example, if you are moving a die that can move three spaces, then you may only capture on the third move. DUEL! is over when: a player captures the other players King, or moves his King to the spot originally occupied by the opposing King.

MISER (Requires 16K machine). MISER 'tis the game of Adventure, and will keep you occupied many an hour. There is treasure to find, and danger to avoid. We will only tell you a few of the commands, since discovering the commands is part of the charm of the game. You move by typing "N" to go North, "S" to go South, etc.). To find out what all you are carrying, give the "Inven" command. And to get your current score, type "Score".

Dedicated MISER freaks construct a map as they play so they know where they have been. And they are willing to try lots of different possible commands, just to see what the stupid machine really wants them to say. And they get rather excited when they think they've solved the puzzle.

PROCHAR This is a handy little character editor that makes it easy to design programmable characters for the Commodore 2022 printer. You use the simple commands (which are shown on the screen) to build a character design that you like. Then, to see it on paper, press [P].

MORE ABOUT 8K PETS AND VARIOUS ROM FLAVORS

In CURSOR 25 I muttered about the number of variations of ROMS that Commodore has blessed us with. What I meant to say (but evidently didn't say very very well, given the mail I've received) was this: it is not economically feasible for us to do exhaustive testing of CURSOR programs on all the combinations of Basic ROMs and, in the case of data files, DOS ROMs. That does NOT mean we plan to ignore the problem. We still test our programs on every variety of ROM we have available. (And now that Commodore has brought out the "Fat Forty", there are five, count 'em, _five_ major breeds: Old ROM, New ROM, 4.0 ROM, 80 column 4.0, and Fat Forty. And that's not counting the flavors of DOS.) Most CURSOR development work gets done on a 4.0 ROM machine, or on an CBM 8032. When a program is about finished, we also test it on Old ROMs and New ROMs, and the Fat Forty. You loyal folks with the Old ROM PETs can start sleeping better at night, knowing that CURSOR hasn't abandoned you.

Which brings up the subject of 16K programs. This is the probverbial "between a rock and a hard place" situation. If you are the proud owner of a 32K Commodore IBM Slayer, you want us to publish at least some 16K programs. But if you own a Chuck Peddle Special (the faithful old ROM 8K PET with the microscopic keyboard), you get pretty nervous when the 16K programs start to flow! In the next few issues you can expect to see a "sprinkling" of 16K programs. When we have something that crys out for more memory, we are going to let it grow past 8K. If it can be done in 8K, and it's 9K, we'll probably put the CURSOR wizards to work and trim the damn thing down to 8K minus a couple of bytes. (If you only knew how much grief the 8K limit has caused over the last three years....)

A CURSORY GLANCE

There has been a "silent" price increase for the VIC. Although the VIC still retails for $299.99, that price doesn't include the RF modulator that is needed in order to use it with a television. We understand that most dealers are selling the modulator for an additional $30, so the VIC really costs $330.

Now, at $330, the VIC is still a lot of computer for the money. But other computer companies have responded to the VIC, and the battle looks like it may be interesting. For example, the Atari 400 is discounted to about $375, including the 8K Basic cartridge. The Atari has 16K of memory (vs. the VIC's 5K), displays 40 characters across the screen (vs. 22 for VIC), and has much more sophisticated graphics capability. The Atari factory is running two shifts per day, and can't fill all of the orders for either the 400 or 800 models. The Radio Shack entry into the "Barbie Doll" computer sweepstakes is the Color TRS-80, which is selling very, very well. Texas Instruments has cut the price of their home computer to the point that it sells for $369 from mail order discount houses. In case you didn't know, the TI-99/4A now sports a close approximation to a full keyboard, has 16K of memory, and has better graphics than the VIC.

That's not all! The Sinclair ZX81 has arrived, with two-page advertisements everywhere you look. And such a deal: for $150 you get a tiny little Z80-based computer with 1K of memory. For only $99 more, you can buy 16K of additional memory, and have a 17K machine for $249. True, there is no color, and the keyboard is a flat plastic membrane. I think the Sinclair will be purchased by lots of people as an inexpensive way to learn about computers. True, the VIC at twice the cost is more that twice as powerful. But at the very low end, a hundred dollars difference in price is enormous! So, the VIC is caught in the middle: the cheapie ZX81 beneath it (at $150), and the Atari 400 and TI immediately above it (and both have 16K of memory). Commodore will have to hustle!

We've recently found out about two very important changes that Commodore will make in the next six months. First, the VIC-40 chip is now working in prototype VICs. The new chip will first be used in the current VIC as a "retrofit", and could be available as early as April, 1982. Later, maybe this time next year, we should see a redesigned VIC that will have 16K of memory.

The really big news is that the current PET/CBM line may be completely dropped by the summer of 1982. The packaging of the new line of Commodore computers is being designed by none other than the design staff of Porsche, as in "Porsche automobiles". The working name for the new product is the "Porsche PET", and we understand that the least expensive model will cost about $2,500. It will have an improved (faster, and more instructions) version of the venerable 6502 microprocessor. Now, if Porsche only had the expertise to redesign what goes _inside_ the pretty new box...

The SuperPet has arrived. The Waterloo software is _excellent_, and comes with the great documentation that Waterloo is famous for. When I worked as a consultant at a university computer center, the compilers from Waterloo were the most-used and most popular on campus. The people at Waterloo know what they are doing, and have done a great job of making their software work on a microcomputer. However, I do not expect the SuperPet to be a success. Compared with IBM's new Personal Computer, it's cheaper, but it is a "kludge" that was an afterthought, rather than being designed from the ground up. When the Waterloo software is available on the IBM PC, the SuperPet will quietly fade away.

I think that the moment of truth for Commodore will occur in the next 18 months. Consider the dreary facts: Commodore is not CP/M compatible, when the rest of the world is adopting CP/M (a registered trademark of Digital Research, Inc) at a rapid pace. The VIC is late to the market (only 10,000 have been sold in the US so far), has only 22 columns on the screen, and doesn't have enough built-in memory. Many, if not all, of the highly talented, creative engineers and software folks that brought you the original PET have left Commodore. And the management turnover at all levels over the last few years has been devastating. True, Commodore made a net profit of 7.5 million dollars in the first quarter of their current fiscal year. But for now, the future looks much less promising.

CURSOR 28 HAS THESE PROGRAMS:

COVER28! Watch the weaver at a loom. By Bob Carr.

SKEET! Shoot those clay pigeons! By Bob Carr.

BLASTO! You have two minutes to destroy the mines! By Robert Noteboom.

STOP! Can you reach the top first? (But don't push your luck...) By Randal Lockwood.

VOZ Which chess piece is which? By Gary Marsa.

FLAGS Practice your semaphore code. By George Huang.

(Program names ending with '!' use CB2 sound)

MORE ABOUT THE PROGRAMS

SKEET! You are at the gun club, trying to shoot the clay pigeons that are thrown overhead. To throw a clay pigeon, press any key (except "Q", which means "quit"). To fire your shotgun, press any key except "q".

BLASTO! This game is simple, but lots of fun. You are trying to get the highest possible score in two minutes. You move by using the numeric pad in the normal fashion: [4] to move left, [6] to move right, [8] is up, and [2] is down. To fire, press [space]. The mines are shown on the screen as "#", and when they explode, a "chain reaction" starts that causes several of the surrounding pieces to also explode. From our experience, if you get a score over 3,000 you are a Blasto! superstar!

STOP! The object of STOP! is to "capture" three of the twelve columns on the board (which is shaped like a "stop sign"). To capture a column, you must move your permanent "marker" to the top of that column. You can play against the Pet, or another player. To play, you roll four dice. You may place up to a maximum of three temporary "markers" on the board according to the sum of any two dice. To make things easier for you, the Pet calculates all of the possible sums, and asks you to select the pair of sums you want. After you select a pair, the markers are placed on the board, and you are asked whether you wish to roll the dice again "R", or want to stop "S". If you stop, your temporary markers are replaced with your permanent marker, and the other player (or the Pet) gets their turn.

There's one catch to all this: if you ever find you can't move or place any temporary markers after a roll, you get "zapped" and lose all the progress you made that turn. For example, you have markers in columns 10, 11 and 12. You roll 1, 3, 4 and 5. There is no way you can use those dice, as all your temporary markers are placed already, and you can't move any of them. Another example; columns 6 and 7 are captured, and you have a marker in column 8, and you roll 3, 3, 3 and 4. Any pair of dice from that set will add to either 6 or 7. Since you can't place a marker in either column, you get zapped, even though you don't have all three temporary markers placed.

You'll notice that some columns are much taller than others. For example, the "3" column is a lot shorter than the "7" column. Hmmm... sounds like the short columns are easiest to win, right? Wrong! If you stop and think about it (no pun intended) some combinations of dice are more likely than others. The height of a column in STOP! is proportional to how likely you are to roll that combination. For example, you can get a seven by rolling "6 and 1", or "5 and 2" or "4 and 3". But you can only get a six by rolling "5 and 1", "4 and 2" or "3 and 3".

To me, STOP! is especially fun because of the control you have over the degree of risk that you want to take. If you play very, very conservatively, you'll never be "zapped". But you'll probably always lose, too. The Pet plays a very respectable game, good enough to be lots of fun to play against. There are a couple of hints you might want to keep in mind. First, once you've gotten a marker to the top of a column you should immediately "stop", regardless of how few temporary markers you have on the board. In general, if you roll a combination where you get two sums that are the same (such as "10 and 10"), you should select that combination. Why? Because you are able to move that marker up two squares, but have only "used up" a single temporary marker. You'll have to decide for yourself how wise it is to roll again when you have two temporary markers on the board. Naturally, it depends on which columns the existing markers are in. If they are in short (i.e. unlikely) columns, you are taking a big chance of getting a "zap". On the other hand, if one temporary marker is in the seven column (the most likely combination that you can roll) well - it's most likely that you should roll again.

VOZ Here is another "thinking" game. A chess board is displayed, with five chess pieces placed at random locations. You have 12 chances to try and determine the identity of each piece. You can find out only one thing: how many pieces would attack a specific square on the chess board. From that information, you can start to figure out the identity of various pieces. Note that there is one of each chess piece except the pawn. When you think you know the name of a piece, type the location of the piece followed by an equals sign and the letter that names that piece. (K=King, Q=Queen, B=Bishop, N=Knight, and R=Rook). For example: "3A=Q" means "I think that the grey piece at location 3A is a Queen".

When you ask about the number of pieces that attack a certain location, the Pet prints the number in that square, unless it is a square that is occupied by one of the chessmen. In that case, it puts the information to the left of the chessboard. There is a limit of twelve moves, but no time limit. So, it is wise to carefully plan your questions, so as to get the maximum amount of information from each question.

FLAGS! This program will teach you the semaphore code that was once used by the Navy (and is still taught to Boy Scouts, I guess). Semaphore uses two flags, and has a unique flag position for each letter of the alphabet. You type in a message, and the Pet displays the appropriate sequence of flag positions to send that message. There are two options: you can control how fast the message is sent, (a zero delay between letters is very fast, a delay of 100 is quite slow), and you can select whether or not you want to see the message displayed at the bottom of the screen.

"I may have my faults, but being wrong ain't one of them."
— *Jimmy Hoffa*

A CURSORY GLANCE

The revolution continues: low memory prices and 16-bit processor chips are resulting in high-powered, inexpensive systems. Examples: the IBM Personal Computer, Chuck Peddle's new Victor 9000 (also called the Sirius One), the Fortune Systems machine, and the Radio Shack Model 16. The IBM and Victor both use the Intel 8088 chip, while the Fortune and Radio Shack use the Motorola 68000 processor. The Victor 9000 is a very interesting machine, since it is so similar to the IBM. It uses the same operating systems as the IBM, but has several technical advantages, including excellent high-resolution (400 by 800) graphics and disks that store about 600,000 bytes each.

The recently announced Radio Shack Model 16 offers the most raw computer power for the least money of any machine to date. Its 68000 processor is much more powerful than the competing Intel 8086/8088 chip, since it directly addresses 16 million bytes of memory. The 8086 only addresses one million bytes, and it looks at memory as 64K "segments". You get a segment for your code, another for your data, a third segment for your stack, and a fourth "extra" segment. This scheme works (although it's hard to use), and Intel was able to ship the 8086 long before Motorola had working 68000 parts. The result: many companies (including IBM) designed the 8086 into their products. However, the Motorola chip is now available from several companies. And lots of the new generation of personal computers will use the 68000. (Subscribe to DTACK Grounded, 1415 E. McFadden, Suite F, Santa Ana, CA 92705 for the best source of information about the 68000. The author is outrageous and fun to read).

Memory prices are coming down rapidly. One large computer company is purchasing 64K memory chips for about $2.60 each. It takes eight chips for 64K bytes of memory. (Well, nine if you implement a simple error detection scheme called "parity", which IBM does on its PC). So, the chip cost for 256,000 characters of memory is under $100 right now.

The same factors that make possible the very powerful $3,000 to $5,000 machines can also be harnessed to produce very inexpensive home computers such as the Sinclair ZX-81, VIC-20, Atari 400 and Radio Shack Color Computer. Since it was introduced less than a year ago, over 250,000 ZX-81s have been sold! The VIC-20 is also selling very well, and the Atari is selling so well that sales are limited by production capacity.

But better things are on the way. At the Winter CES show, Commodore showed prototypes of two new machines. The Ultimax is a $149 color game machine that also has a flat plastic keyboard but does not include Basic. Its big brother will be called the Commodore-64, and will sell for only $599. That's right: a 64K computer with 25 lines of 40 columns each, and spectacular color graphics and sound for only $599. This machine has considerably more graphics capability than the Atari. And Commodore must have a music synthesis fanatic somewhere in its design team, because the new sound chip is a very capable three-voice music synthesizer. There will even be an optional Z80 cartridge that will run CP/M. Don't be confused by the fact that they packaged this new product in the same plastic shell used for the VIC-20. What's inside is completely different from the current VIC. Availability? My guess is that we won't see the Commodore-64 in quantity before about October, but some folks at Commodore are saying July. (They didn't mention the year, however...)

There are rumors of yet another series of machines from Commodore in the $2,000 price class. (The Porche design got rejected, by the way.) And other computer companies are not going to stand by and let Commodore walk away with the market, either. Apple is about to unleash an improved but much cheaper Apple-11. It won't have the flashy features of the Commodore-64, but it will have the advantage of a huge base of software. Atari will also release an improved machine soon. As someone said about the opera: "It ain't over until the fat lady sings."

So what does all of this mean for the future of Commodore? It is not possible to say, at least yet. The new video and sound chips are brilliant technical achievements. If there is strong software support from independent vendors, the new machines will sell very well. (Commodore predicts sales of 100,000 Ultimax machines per month). But I suspect that it will be quite a while before a new version of Basic is available that makes it easy for the average user to take advantage of the new hardware. In the meantime, it will be lots of PEEKs and POKEs, and while that's okay for experienced programmers, it is terrible for the vast majority of novice users. In any case, 1 think a call to your stock broker to place an order for Commodore stock would be a wise move. Can you imagine what the CURSOR folks might be able to do with 64K, color and sound...

CURSOR 29 HAS THESE PROGRAMS:

COVER29 The juggler. (Such coordination!) Graphics by Mark Baker.

PONG! Four *very* fast arcade-style games. By Georg Feil.

CLONE! They are out to get you. But which one is you? By Nick Jackiw.

DRONE! Attack the enemy with pilotless aircraft. By Randall Lockwood.

CONTACT A complex (but fun) dice game. By George Leotti.

KRYPTO Select a function of five numbers that yields a given result. By Gary Marsa.

(Program names ending with '!' use CB2 sound)

MORE ABOUT THE PROGRAMS

CLONE You have been condemned to the Dreaded Mines of Milhous, where you'll spend the rest of your days digging fuel for the reactors on the surface. The Mines are inhabited by the Clonestrians, (called Clones for short) who wander the passages of the mine searching for food. Your one advantage over the Clones is that you can outrun them. But they have a bigger advantage: they look just like you!

On the screen, you'll see a map of the Mines, with the passages filled with fuel nodules (marked by ':'s). Your position is marked with a solid white circle. The position of the Clone is also marked with a solid white circle! Use the numeric pad to move around the Mines collecting fuel nodules. For each nodule you get five points. When you've cleared the passages of nodules, you'll be transported to the next level down, where there are more nodules (and more Clones to chase you!).

DRONE! (Requires 16K) Drone! was inspired by articles describing the use of pilotless airplanes (called drones) by the Israeli army. Full directions are included in the program.

CONTACT Contact is a dice game, played with six dice. The object is to score 5000 points, or to get a straight on your first roll in a turn. A "triple" is a three-of-a-kind. A "counter" is a one, a five, or a triple. Each turn consists of one or more rolls of the dice. You keep rolling the dice either until you choose to stop, or until you get a roll with 'no counters in it.

After each roll, the Pet checks for counters in the newly-rolled dice. If you fail to roll at least one new counter, you lose all the points you made in the turn, and the next player gets to roll. If you roll a new counter, you may roll again. If you decide against it, the points you've made in the turn are added to your score, and the next player gets to roll. Once you decide to roll again, you pick one or more of your newly-rolled counters to keep as part of your score. (Any you had previously kept are automatically kept for you as well.) Next, those dice as-yet-unkept are rolled again. (Thus, each roll you roll fewer dice.) Again, if you don't roll any new counters, you lose your turn and the points you made in it. You may keep rolling as long as you can keep rolling counters.

In addition, in the first roll of a turn, some things can happen that can't happen at any other time. As mentioned, if you roll a straight then, you win the game. (You get a straight when you roll all six numbers from 1 to 6 at once.) If you roll a triple-2 (three 2's) on the first roll, you may roll all six dice again, as a new "first roll". If you manage to make all six dice counters at the same time (not necessarily from the same roll), you make "contact", and get a new "first roll" of all six dice.

When you get a new "first roll", either with a triple-2 or by making contact, the counters you had are remembered, and count towards your score for the turn. In addition, all the things that may happen on your first roll may happen on the new "first roll" (even though it isn't really the first roll of your turn). That is, a straight will win the game, and triple-2's will allow you to roll again. Scoring: If your turn ended by not rolling any new counters, you get no score at all for that turn. Otherwise, the various counters score as follows:

Counter	Number in a single roll	Score for each set
1's	one or two	100 points
	three	1000 points
	four	1100 points
	five	1200 points
	six	2000 points
5's	one or two	50 points
	three	500 points
	four	550 points
	five	600 points
	six	1000 points
Triples	one or two	100*number (for example, triple-2 is 200 points)

KRYPTO A card game designed to improve your mathematical abilities, played with a deck of 52 cards in two sets numbered from 0 to 25. Each player is dealt five cards. One more card is dealt face up on the table. The number on that card is the "target". The object of the game is to invent an expression whose value equals the target. The expression must use all five numbers in your hand, along with the add, subtract, multiply, and divide operations. (You may use one, several, or none of any given operation.) Parentheses are also allowed, to override the normal order of evaluation. (Normally, multiplies and divides are done before adds and subtracts. A run of multiplies and divides (or of adds and subtracts) are done left-to-right.) Each turn, you may either discard a card and draw a new one, or propose an expression. To propose an expression, type it in to the Pet, including all the numbers and operations. The Pet will check it, and if it is correct, you win the game. If it isn't correct, play passes to the next player. If you take longer than three minutes you lose your turn.

PONG! (40 column Pets only) With this program, you have three games (tennis, hockey, and squash), plus a practice mode. Each game is a two-player game, with a grey player and a white player. Grey is on the left, and uses the [W] and [X] keys to move his paddle up or down. White is on the right, and uses the [8] and [2] keys to move his paddle. Each game has four skill levels: Beginner, with long paddles and a slow ball; Intermediate, with short paddles and a slow ball; Advanced, with short paddles and a slow ball; and Pro, with short paddles and a fast ball. A game lasts until one player gets fifteen points, or until the [SPACE] key is pressed. If [SPACE] is pressed, the games ends when the next point is made, NOT necessarily at the moment you press [SPACE].

In the **Tennis** game, the players are on opposite sides of a court. Each player hits the ball back toward his opponent. A point is scored when the ball is missed, and hits the backwall. In **Squash**, the two players are on the same side of the court. The opposite end of the court is walled over. The players take turns hitting the ball with their paddles. On the first serve, White must hit the ball first (then Grey, then White again, and so on). On following serves, the player who missed must hit the ball first. A player gets a point when his opponent misses the ball. In **Hockey**, each player has two paddles, offensive and defensive. A player scores a point by getting the ball into the opponents goal area.

*"And I asked myself about the present:
how wide it was, how deep it was,
how much was mine to keep."*
— *Kurt Vonnegut, Jr.*

A CURSORY GLANCE

The replacements for the PET and CBM were shown at the recent fair at Hannover, West Germany. The PET-2 (also known as the "500 series") is a keyboard console that is used with a separate color television. It has the familiar 25 rows of 40 characters, and uses the same chips for creating graphics and sound that are in the Commodore-64 computer and the MAX (formerly "Ultimax" or "VIC-10") game machine, but not the same as the VIC-20. The PET-2 comes with 64K, 128K or 256K of RAM memory. With an external expansion board, as much as 512K of RAM can be supported. What's more, if you add the appropriate attachment, the PET-2 will support the CP/M operating system. That's right, 1 didn't stutter: Commodore is moving into the wide world of CP/M   (a trademark of Digital Research). The new PET is pretty: no more bulky sheet metal. Instead, there is a sleek, low-profile keyboard enclosure that is much more attractive than the VIC-20. There is a full ten-key numeric pad, plus 16 function keys across the top of the keyboard. We don't know anything about the flavor of Basic that the new PET will have, although history would tell us to expect some changes from the current version 4.0.

The new CBM-2 (or "700 series") has a built-in green monitor with 25 lines of 80 characters. The keyboard is detachable, and closely resembles the PET-2. The monitor sits on top of a base that holds two 5-inch floppy disk drives. We think that the CBM will come with the so-called "Business Basic" that has been floating around Commodore for several years, which features 18-digit decimal arithmetic. (The standard Microsoft Basic uses 9-digit binary arithmetic. For dollar-and-cents work, this causes some tough problems, since numbers are not represented exactly to the penny. With decimal math, decimal numbers are represented exactly.) One model of the CBM-2 has 128K of RAM, the other has 256K, and can be extended to 512K.

Some or all of these new models will accept an Intel 8088 16-bit processor chip. (The top CBM-2 model comes with this feature.) This means that Commodore has decided to go head-to-head with the IBM personal computer, as well as similar machines such as Chuck Peddle's Victor-9000. Since 1 have not been able to see the new machines, or even read technical details, it is impossible to say whether Commodore has a chance against these worthy opponents. Given a price that is low enough, they should be able to get a good market share. Will they hurt IBM personal computer sales much?   Not likely, although IBM prices may come down a bit when the Commodore machines appear later this year. (The three most powerful letters in computing are "I B M". Individuals and organizations that would never dream of buying an Apple, Radio Shack or Commodore are buying IBM PCs by the dozens.)

The MAX game machine will start to dribble out of the factory in July, as will the Commodore-64. The MAX will cost $179 (not $149 as originally claimed), and the C-64 will be $595. I am willing to predict that we will see a Commodore-16 before long, priced about the same as the current VIC-20. When that happens, it will be the beginning of the end for the VIC, since a 22-column machine just doesn't fit into the new product line. The VIC-20 is selling very fast right now, often at heavily discounted prices. (We've heard of a toy chain selling the VIC for $229, which is about $6.00 over their cost!) Radio Shack has just cut the price of their Color Computer to $299. (Rumor has it that a new low-end Radio Shack will be announced soon. Seems that it will have 64K, etc. etc.)

I expect the VIC-20 to have a fairly short life. The VIC gave Commodore a very cheap product that it could sell while the 40-column machines were being designed. But once the new products are ready, in large volume, the VIC will become an instant orphan. In fact, it will probably go down in the history books as the personal computer with the shortest life. I wonder how those 200,000 VIC owners will feel when they realize that they bought an obsolete machine?

Commodore will release its own 16-bit microprocessor chip in early 1983. Cost? Only $6.00, according to a usually reliable source. (Low prices are a Commodore hallmark.) We don't have many details, but are told that the new chip will be very similar to the very popular 6502 that is used in the PET, Apple, and Atari.

Clive Sinclair is going to keep Commodore's feet to the fire: his new Spectrum color computer will be cheap (about $220 for a 16K model) and will have a very inexpensive 3-inch disk as an option. If you are one of those that turned up your nose at the ZX-81, please be informed that it has now sold about 500,000 copies worldwide. Timex will soon be selling a slightly improved model wherever their watches are sold. Price: $99.00, with another 16K of memory costing only $49.00. (By way of contrast, a 16K memory add-on for the VIC-20 is currently about $120.)

————— CURSOR 30 HAS THESE PROGRAMS: —————

COVER30   Polygon patterns. Graphics by Brian Sawyer.

DIVE   Dive for treasure, but avoid the sharks! By Pat Persch.

SLIDE   Can you catch all of the falling rocks? By Kevin Pickell.

BREAK   Try to break all of the bricks. (A very fast game!) By Georg   Feil.

REBOUND   A simple game that will test your reflexes. By Steven Larson.

ZIP   Catch the creatures. By Craig Eisler.

(Program names ending with '!' use CB2 sound)

MORE ABOUT THE PROGRAMS

DIVE   You command a crew of divers that are trying to recover ancient gold treasures from a sunken ship at the bottom of the ocean. There is one problem, however: several very hungry sharks are in the area, creating great danger for your divers. The movement of the divers is controlled with the numeric pad: press [2] to dive down, [6] to go to the right, [4] to go left and [8] to go up. You can rest by pressing [5], although you will continue using your air. (If you give up, press [Q] to quit...) As the diver swims down to the treasure, his (or her) air tanks are gradually exhausted, as shown by the scale at the upper-left part of the screen. If you choose the more difficult level of play, the divers are given less air, while at the "easy" level they get more air. The number of remaining divers in your crew is shown by their diving helmets on the deck of the ship. You have a crew of five, but it is considered to be very poor form to sacrifice the entire crew just to reward your greed...

SLIDE   (Requires 4.0 ROMs. May not work correctly with some business keyboards.) This very fast machine language game requires that you have fast reflexes. You control a paddle (actually, you begin with a stack of six paddles) and try to prevent the rocks from falling to the ground. On the standard graphic keyboard, you control the paddle with the [4] and [6] keys. On some 8032 machines, you will need to use the [P] and [DELETE] keys. On others, you'll have to experiment.

When you miss a rock, all of the rocks in mid-flight vanish, and then play continues. When you completely empty a row of rocks, you lose one of your paddles (which makes it quite a bit harder to catch falling rocks). The game is over when you miss six rocks.

BREAK   (Requires 40 column 4.0 ROMs.) Another excellent (and also very fast) machine language game where you control a paddle. In this one you are trying to break all of the layers of bricks at the top of the screen. A ball is launched down from the bottom row of bricks, and your task is to move the paddle (with the [4] and [6] keys) so that you bounce the ball back up toward the bricks. When the game begins, you have five balls. Each time you miss, you lose that ball. Should you completely clear the screen, you'll be awarded extra balls.

REBOUND   A very simple game that may send you to the nuthouse!   A target (shown as a grey square) appears on the screen, as well as a moving ball. You are able to place deflectors in the path of the ball by pressing any of the keys [1] or [9], which insert a right-diagonal in front of the ball, or pressing [7] or [3] which place a left-diagonal in front of the ball. You can get rid of a deflector by pressing [5] just as the ball hits it (which is harder than it sounds). You have two minutes per game, and your goal is to hit as many targets as possible.

ZIP   You control a strange new robot that bounces off of walls, and that is armed with a powerful laser weapon. The robot is trapped inside of a maze that has mines, shown as stars "*", and targets, shown as hollow circles. You control the direction of the robot by using the numeric pad in the usual manner. (The robot can move diagonally as well as horizontally and vertically.) The laser is fired by pressing [5]. You get credit for each target that you destroy, but no credit for destroying mines. (However, destroying mines can be useful, since it will clear your path.) Your robot bounces off the walls automatically, but is destroyed (and the game ends!) when it runs into any other object.

Besides the mines and targets, two other types of objects will sometimes appear: "mystery objects", that are shown as a question mark "?", will have an unknown effect when you fire the laser at them. Sometimes you'll get extra points, other times you'll go into hyperspace and be transported to another part of the maze. You can get rid of mystery objects by running over them. Every now and then a new piece of wall material will appear in the maze. These are hazardous, since you die if you run into them!

WEATHER

In editing the WEATHER program, we introduced a serious bug which causes the results to usually be incorrect. Needless to say our faces are red! As the author said when he corrected our mistake: "The program won't send anyone flying into a snowstorm, but it will keep them grounded on a nice day!" Here's the fix:

Change line 290 to: T1=Z(1): B1=Z(3): T2-Z(2): B2=Z(4)

SHEEP

There are two problems with SHEEP. One causes the sheep to behave rather strangely, taking off in a sort of wild gallop! The second is that should you be very patient (given the first bug) and be able to herd the little critters all into the barn, the pesky game doesn't restart properly. (How's that for ingratitude?) With these corrections, you'll find it much more fun to ride the range:

Change line 354 to: CT=0: GOTO 110
Change 370 to: FOR I = 1 TO 9
Change 390 to: DR=0: SN=1: DF=DP-SP(I): IF DF < 1 THEN DF= -DF: SN=-1

JOUST

There is a way to 'speed up' the display of stuff on the screen that works very well on "new ROM" Pets. We used to think it was harmless (although ineffective) on "old ROM" Pets. Well, guess what: seems that sometimes it is harmful on old Pets, and in fact makes things go more slowly!

Change line 170 to: IF PEEK(50000) THEN POKE 59458,PEEK(59458) OR 32

CORRECTIONS FOR CURSOR 23-25   (As of June 15, 1981)

As you may have noticed, Cursor programs sometimes have errors or "bugs". We correct these bugs just as soon as we find out about them. Depending on when you bought a specific Cursor tape, we may have already fixed these problems in your copy! We will replace any back issue of Cursor with a new tape, in exchange for your original tape and a handling charge of $2.00 per tape in the US and Canada.

ENIGMA 23

> Change allows 17,576 cipher alphabets. (Instead of only 26!)
> ```
> 650 S(1)=S(1)+1: IF S(1) < 27 THEN 680
> 660 S(1)=1: S(2)=S(2)+1: IF S(2) < 27 THEN 680
> 670 S(2)=1: S(3)=S(3)+1: IF S(3) < 27 THEN 680
> 675 S(3)=1
> ```

PRINTSIT 24

> FOR OLD ROM PETS - Prevent line feeds between printed lines
> ```
> 59006 ZS=46: GOSUB 59150: PRINT#4
> 59130 NEXT ZT: PRINT #4: ZS=45: GOSUB 59150: PRINT #4: CLOSE 4
> 59140 ZS=24: GOSUB 59150: RETURN
> ```
> TO ALLOW PRINTING RVS STRING CONTAINING CHR$(226)
> In line 59090 add "AND ZS=0" after "Z=34"

RACER 24

> Improves response of keyboard
> ```
> 980 FOR Y = 1 TO N: NEXT Y: E=A: GET B$: B= VAL(B$)
> 1000 IF B$= "" THEN 1100
> ```

XREF 25

> Allow variables that start with "Z" to be crossreferenced
> Also, the pi symbol caused problems
> Load your copy, and then POKE 3559,1
> POKE 3724,11
> Then SAVE your corrected copy.
> These two errors were not in Jim Butterfield's
> original program. They somehow got introduced by us when we modified
> and adapted the original program. Sigh...

PRICER 7

> Correct the way that direct costs are computed
> Change line 2850 to:
> ```
> 2850 FOR J=1 TO DC: PR$=DC$(J)+"?": GOSUB 59000: DC(I)=DC(I)+N: NEXT J
> ```
> Note: if your copy of PRICER contains line 2865, delete that line.